HP Performance Optimized Datacenter 240e North America (Adiabatic) User Guide

Abstract

This guide is intended for the person who operates and maintains the HP Performance Optimized Datacenter 240e NA (HP POD 240e NA).

Part Number: 748899-001
November 2013
Edition: 1

© Copyright 2013 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Contents

Overview 6
Before you begin 6
Operator safety 6
Component safety 6
Fire detection 7
Preventative maintenance 7
Environmental considerations 7
Component identification 8
Structural component identification 8
Parts and part number identification 9
Life safety component identification 10
Electrical power component identification 13
Control cabinet component identification 16
Security component identification 17
Racks 18
Life safety systems 19
Life safety overview 19
EPO system 19
ECS touchscreen and EPO indicators 20
EPO modes 21
EPO accidental activation 21
Battery backup during an EPO event 21
Fire detection system 22
VESDA air sampling smoke detection system 22
Manual fire pulls 22
Fire alarm panel 23
Fire alarm indicators 23
Emergency egress 24
Power, electrical, and controls 25
Site electrical system 25
Power safety 25
Grounding and bonding 25
Capacities 26
Power feeders 27
Electrical panel labels 27
Power distribution: electrical busway system 28
Power distribution: Adiabatic system 28
Panel schedules 29
Wire color code 29
Electrical busways 30
Drop boxes 32
Rack power 32
Lighting 33
Environmental control system 34

Environmental control system overview 34
Using the ECS 34
Components of the ECS 35
Satellite control boxes 35
Facility connections to the ECS 35
Connecting to the ECS through the demarcation box 36
Connecting to the ECS through connection portals 36
Managing the ECS from the HP POD 240e NA 37
Configuring the ECS 38
Logging in remotely to the ECS 40
Password protected 42
Navigating the ECS interface 42
Logging in to the ECS touchscreen 43
View 43
Configure 54
Managing the ECS system 56
Setting the Min and Max temperature and RH setpoints 56
Setting the Min and Max range for alarms 56
Setting the offset alarm 57
Setting the IP address 57
Forcing an alarm 57
Maintaining the ECS parameters 58
Temperature and pressure sensors 58
Adiabatic units 60
Controlling the hot aisle fans 60

AHU system 61
Overview 61
Adiabatic components 61
Adiabatic media 62
AHU theory of operation 62
Static pressure control 65

IT networking and communications 66
Networking 66
Connection portals 66
Demarcation box 67
Fire box 68
Adding a phone 68

Standard components 70
Air filter sensor 70

Optional components 71
HP POD 240e NA optional components 71
Power feeder pull boxes 71

Specifications 72
General specifications 72
Rack specifications 72
Environmental specifications 73

Maintenance 74
Periodic maintenance 74
Preparing the Adiabatic units for winter 74

Supply header gravity drain 76
Adiabatic unit by unit blowdown 77
Supply header blowdown 78
Power up procedure 79
Standard power up procedure 79
Cold weather power up procedure 80
Power down procedure 83
Full power down procedure 83
Contacting HP 84
Before you contact HP 84
HP contact information 84
Regulatory compliance notices 85
HP POD 240e NA regulatory compliance 85
Safety and NEC compliance 85
Safety and regulatory compliance 86
Turkey RoHS material content declaration 86
Ukraine RoHS material content declaration 86
Warranty information 86
Glossary 87
Documentation feedback 90
Index 91

Overview

Before you begin

For more information about site requirements, specifications, power, management requirements, and supported facility connections, see the *HP Performance Optimized Datacenter 240e NA Site Preparation and Requirements Guide*.

The location of various components or subsystems in the HP POD 240e NA might vary from this documentation. For final placement specifications, see the data sheets that are included in the operations and maintenance manual.

Operator safety

The HP POD 240e NA is not habitable or suitable for human occupancy. The HP POD 240e NA is Listed as a Product that provides service access areas for periodic maintenance and service. These areas must be controlled and available for use only by owner-authorized personnel and qualified personnel who are trained in the maintenance and service of the HP POD 240e NA components.

⚠ **WARNING:** To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 240e NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

⚠ **WARNING:** To avoid the risk of personal injury, hearing protection must be worn at all times when working inside the HP POD 240e NA.

⚠ **WARNING:** To avoid the risk of personal injury or damage to the equipment, do not insert anything inside the electrical busways, except for the approved HP busway drop boxes.

Before completing the installation of the HP POD 240e NA, the customer, or a designated agent, is responsible for completing any Environmental Health and Safety evaluation of the HP POD 240e NA or any attached structural component purchased through HP. The customer, or their designated agent, must also complete an arc flash assessment and breaker coordination study of the HP POD 240e NA and the associated electrical supply system for operation and maintenance. The individual or organization that completes the arc flash assessment must also create and provide all required labeling for all electrical panels on the HP POD 240e NA.

Component safety

⚠ **CAUTION:** If the HP POD 240e NA is shut down for an extended period of time, such as during routine maintenance, use desiccant units or materials to eliminate condensation within the HP POD 240e NA. Condensation causes damage to IT equipment and HP POD 240e NA controls.

CAUTION: Electrostatic discharge might damage electronic components. Be sure that you are properly grounded (earthed) by wearing approved grounding straps before beginning any installation procedure or repair.

CAUTION: If any racks contain empty RU space, use the HP POD 240e NA filler panels to maintain the efficiency of the HP POD 240e NA thermal system. Filler panels are available from HP in 10-pack quantities (part number AQ682A) and 100-pack quantities (part number AS993A).

Fire detection

The fire detection system is supplied as a component of the HP POD 240e NA, and is Manufacturer Designed specifically for this HP product, in compliance with national standards.

HP does not certify that the fire detection system that is installed in the HP POD 240e NA meets all local and jurisdictional requirements. The customer is responsible for the following actions:

- Verifying that the POD fire detection system meets local codes, including specific local requirements for initial and periodic inspections
- Arranging for and receiving all required local permits, including initial commissioning as well as standard and repair maintenance
- General maintenance of the fire detection system must be completed by an authorized technician

  For more information, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service guide*.

Any additional local requirements are not covered as part of the installation and deployment services of the fire detection system, unless specifically included in an executed SOW.

Preventative maintenance

You are responsible for creating and performing detailed preventative maintenance based on HP recommendations. Data sheets or additional operation and maintenance manuals will be provided for this task.

CAUTION: Failure to implement a comprehensive preventative maintenance schedule may result in reduced efficiency in the HP POD 240e NA, failure of main or subsidiary systems, and loss of warranty on third party components.

Environmental considerations

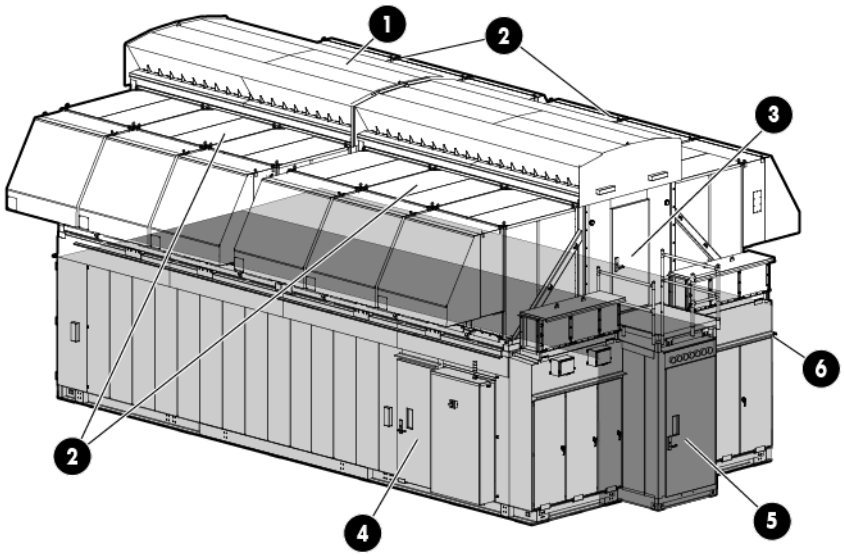
CAUTION: To maintain accurate environmental conditions and minimize condensation inside the HP POD 240e NA, do not leave the HP POD 240e NA doors open during operation.

Component identification

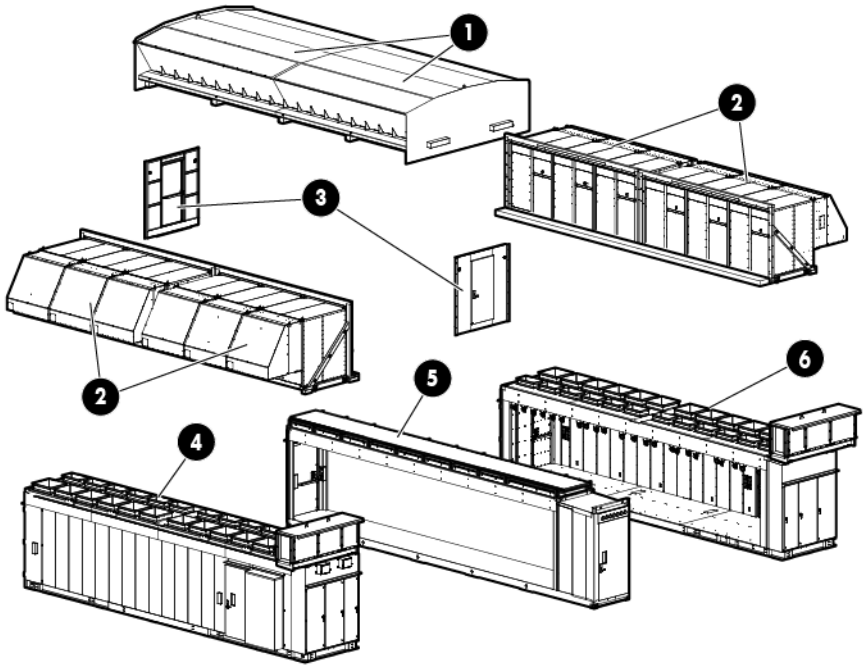
Structural component identification

The HP POD 240e NA documentation frequently refers to these specific components of the HP POD 240e NA.

The following figure shows the assembled HP POD 240e NA structural components.



The following figure shows the exploded view of the individual sections of the HP POD 240e NA.



Item	Component	Description
1	Canopy	The canopy has two 6.10 m (20 ft) parts that are installed on top of the HP POD 240e NA.
2	Adiabatic units and cradles	Each of the four cradles contain three Adiabatic units.
3	AHU service area end walls	The HP POD 240e offers AHU service access in these two locations.
4	IT section A (primary structure)	The IT section A (primary structure) contains the ECS. Conditioned air passes through the IT section A and IT section B structures to force cool air through the IT equipment.
5	Hot aisle	The hot aisle structure is a separate space where hot exhaust air from the servers can be expelled out of the structure or recirculated. The HP POD 240e isolates the IT sections from the hot aisle for efficiency.
6	IT section B (secondary structure)	The IT section B (secondary structure) is similar to the IT section A (primary structure), but IT section B does not contain the ECS.

IMPORTANT: You must consult with the AHJ to determine the egress requirements for the hot-aisle service area that you must provide. Requirements might include landings and stairs to be installed at both ends of the hot aisle service area for emergency egress.

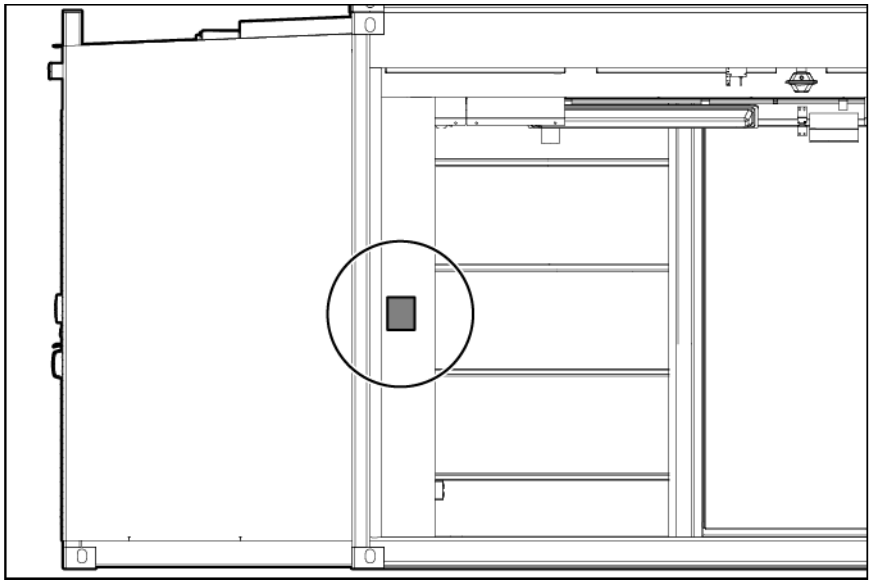
Parts and part number identification

Review all of the contents to identify the following for each component:

Regulatory model number

The following figure shows the location of the regulatory model number and the POD solution serial numbers on the inside of each IT section, adjacent to the bump out.

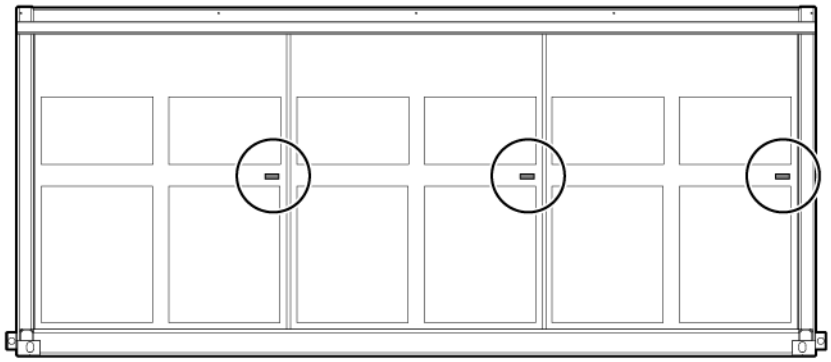
Interior side view shown



CSC Safety Approval placard

Each HP POD 240e NA Adiabatic AHU has a CSC Safety Approval placard that includes model number, serial number, and proof load. Each AHU has a different serial number. The following figure shows the CSC Safety Approval placard locations.

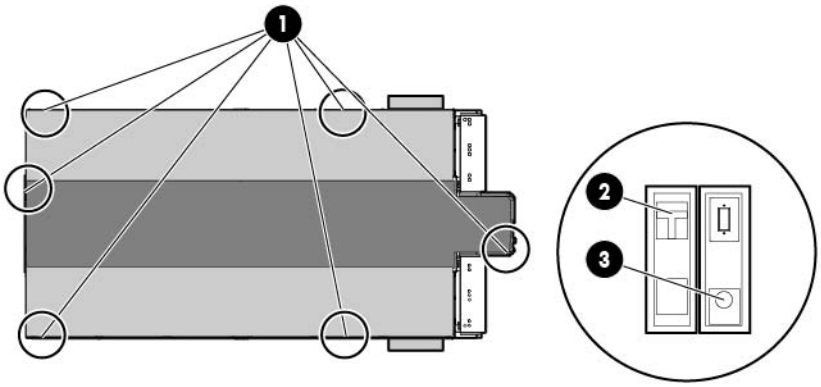
Side view single AHU cradle shown



Life safety component identification

Internal life safety components

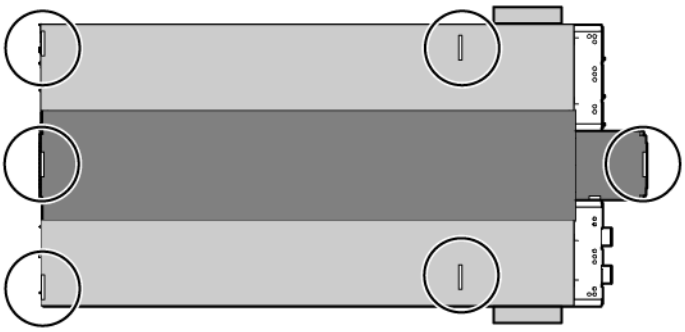
Top view shown



Item	Component	Description
1	Emergency switch locations	There are six emergency switch boxes, one by each personnel access door throughout the HP POD 240e NA. Each emergency switch box includes items (2) and (3).
2	Fire alarm manual pull	Enables manual initiation of the fire system, which includes the activation of the interior and exterior fire strobe lights.
3	EPO button	Disconnects the HP POD 240e NA from main power feeds and activates the red EPO indicator light on the outside of the HP POD 240e NA. To reset the EPO button, switch the EPO to the **Active** position. Failure to do so prevents the HP POD 240e NA from being able to restart.

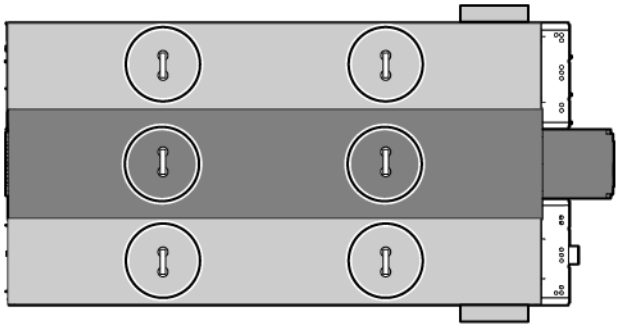
Exit sign locations

Top view shown



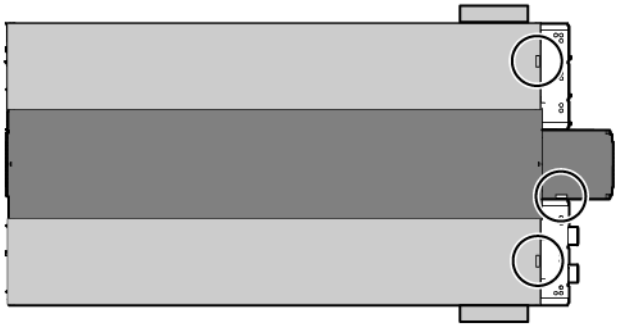
Internal emergency lighting

Top view shown



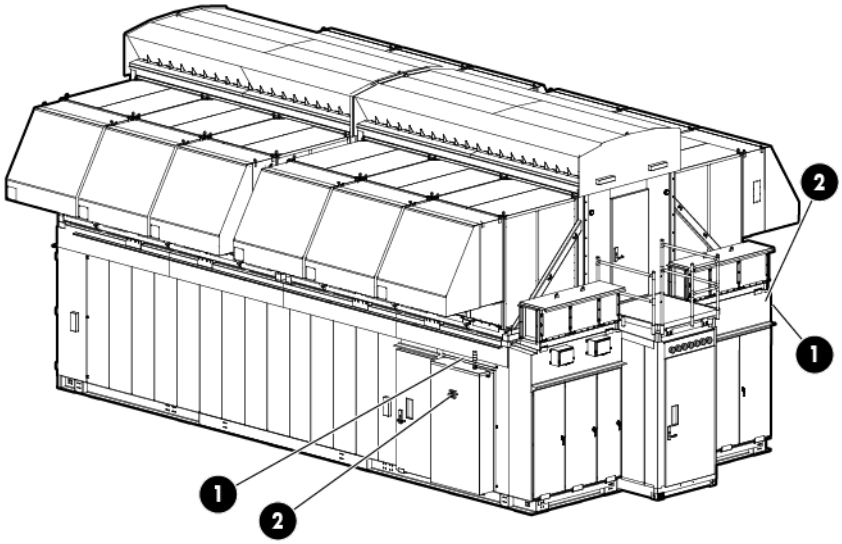
Internal emergency status indicators

Top view shown



There is one fire strobe light in each aisle of the HP POD 240e NA. When illuminated, these lights indicate a fire alarm condition within the HP POD 240e NA.

External emergency status indicators



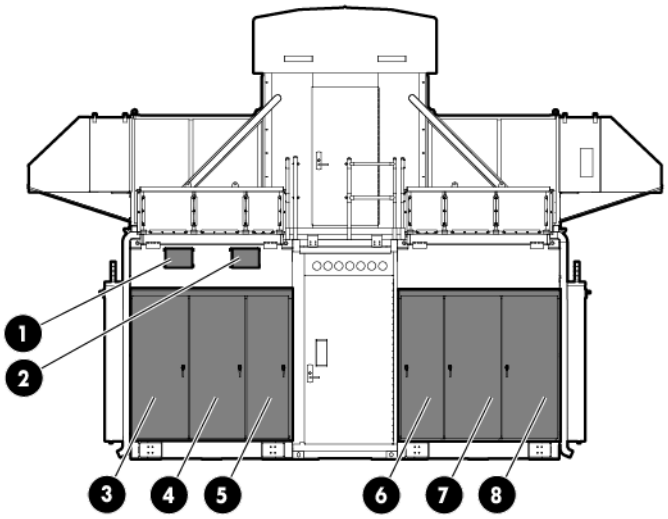
Item	Component	Description
1	External EPO status indicator	Indication of operating status: • White—Normal operating mode • Yellow—Bypass operating mode • Red—EPO shutdown mode
2	Fire strobe light	Indicates a fire alarm condition within the HP POD 240e NA. There is one fire strobe light on each side of the HP POD 240e NA.

Electrical power component identification

WARNING: To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 240e NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

WARNING: To avoid the risk of personal injury or loss of life, all personnel must comply with electrical warning labels when operating and maintaining the electrical panels and systems of the HP POD 240e NA.

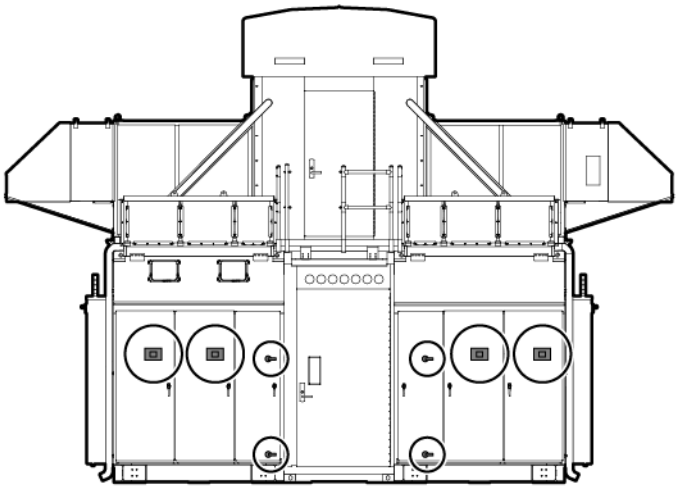
End view shown



Item	Component	Description
1	Demarcation box	Customer communication connection point: • ECS • Access control • Phone
2	Fire box	Connection location for fire emergency and VESDAnet signals
3	415/240V 3-phase, wye, 4-wire	A feed power for IT Section A electrical busways and house power
4	415/240V 3-phase, wye, 4-wire	B feed power for IT Section A electrical busways and house power
5	Mechanical power feed cabinet	A and B feed power for the IT Section A AHU
6	Mechanical power feed cabinet	A and B feed power for the IT Section B AHU
7	415/240V 3-phase, wye, 4-wire	B feed power for IT Section B electrical busways and house power
8	415/240V 3-phase, wye, 4-wire	A feed power for IT Section B electrical busways and house power

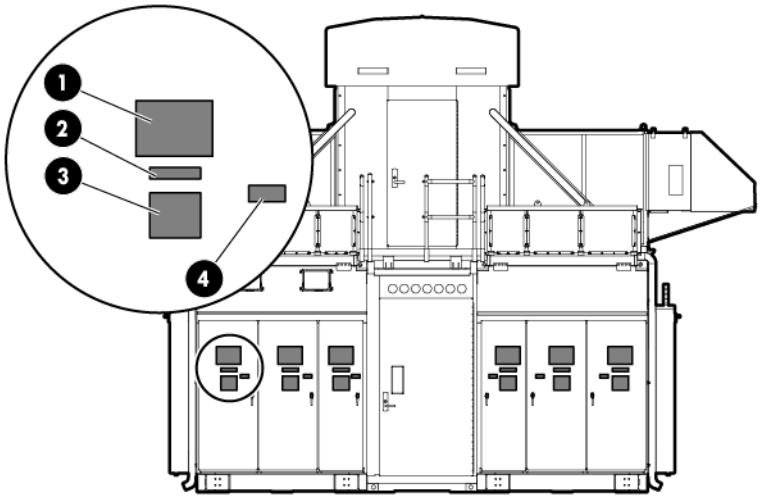
Main breaker locations

End view shown



External safety labels

End view shown

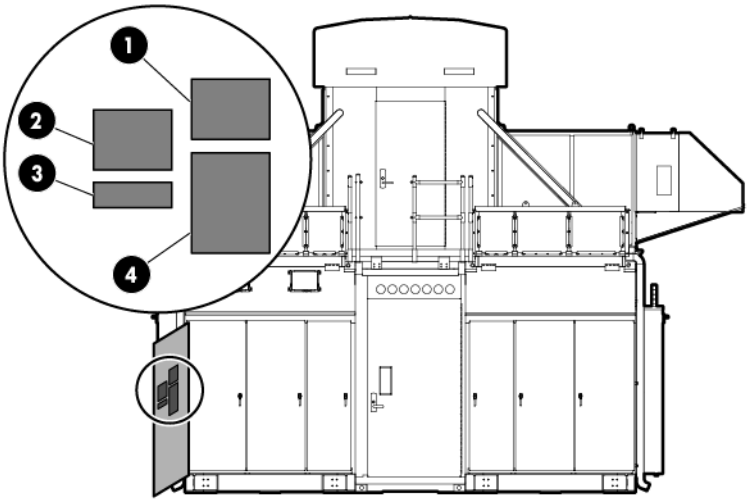


Callout	Electrical safety label	Description
1	Danger sign	Reminds you that the electrical panels must only be accessed by authorized personnel.
2	Disconnect label	Provides the disconnect order for all of the electrical panels.
3	Caution	Cautions you about isolating power from the product.
4	Arc flash warning	Reminds you of arc flash danger and required PPE.

The customer must complete an arc flash assessment of the HP POD 240e NA and the associated electrical supply system for such things as operation and maintenance.

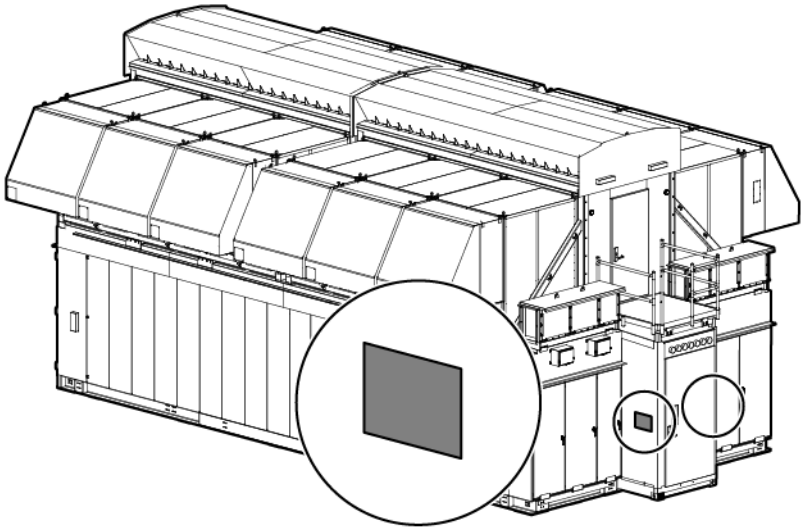
Internal panel labels

End view shown



Callout	Electrical safety label	Description
1	Input power	Lists the input power information
2	Panel schedule/circuit breaker table	Lists the layout and designation for all circuit breakers on the panel
3	Fuse type table	Lists all fuse types and sizes
4	Wire color code	415/240V wye color codes • Purple/Brown • Purple/Orange • Purple/Yellow • Purple/White—Neutral • Green and yellow—Equipment ground

Electrical power disconnect map label location



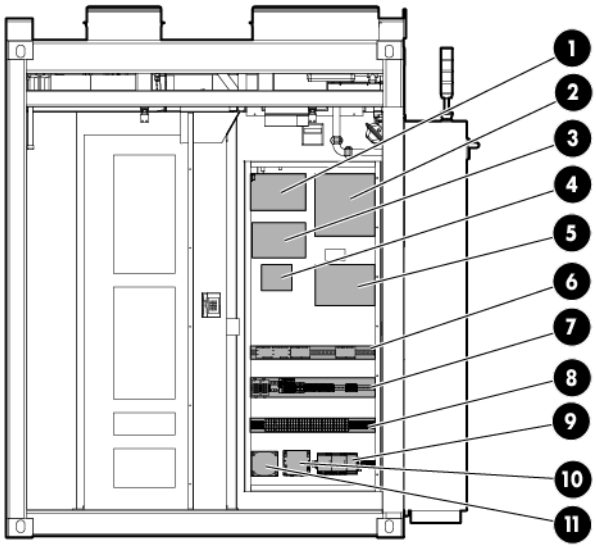
Control cabinet component identification

All circuits in the control cabinet are labeled with the panel name and circuit breaker number.

Each IT section has one control cabinet that houses the various control components for that IT section.

IT section A control cabinet

The ECS and fire panel controls are located in the IT section A control cabinet.

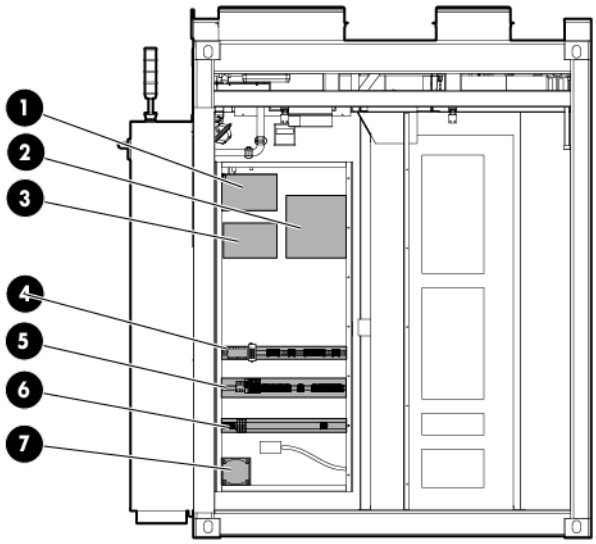


Item	Component	Description
1	VESDA air sampling smoke detection unit	An early warning laser scan smoke detection unit
2	Fire alarm control panel	• Controls all fire systems within the HP POD 240e NA, including the smoke detection system and manual fire pulls • Includes a battery backup system to provide backup power to the fire system in the event of power loss to the HP POD 240e NA
3	UPS	Provides backup power to the IT section A VESDA in the event of power loss to the HP POD 240e NA
4	Access control module	Controls and organizes information that is monitored by the HP POD 240e NA access control components
5	Customer access control junction box	Provides a location for the facility access control components and connects the facility to the HP POD 240e NA
6	ECS relays	Relays for the ECS control
7	ECS modules and terminal blocks	Used for ECS communication, I/O connections, and terminal block connections
8	House power fuses and terminal blocks	Provide house power to the HP POD 240e NA convenience outlets and lighting
9	Power supply*	Provides 24V DC power to the PLC, ECS, and LED lighting
10	UPS*	Provides battery backup power to the PLC and ECS in the event of power loss to the HP POD 240e NA
11	240/120V transformer	Provides house power to IT section A convenience outlets

Item	Component	Description
NA	PLC*	The computer located on the inside door of the control cabinet that controls the ECS system

*These components are only installed in the IT section A control cabinet.

IT section B control cabinet



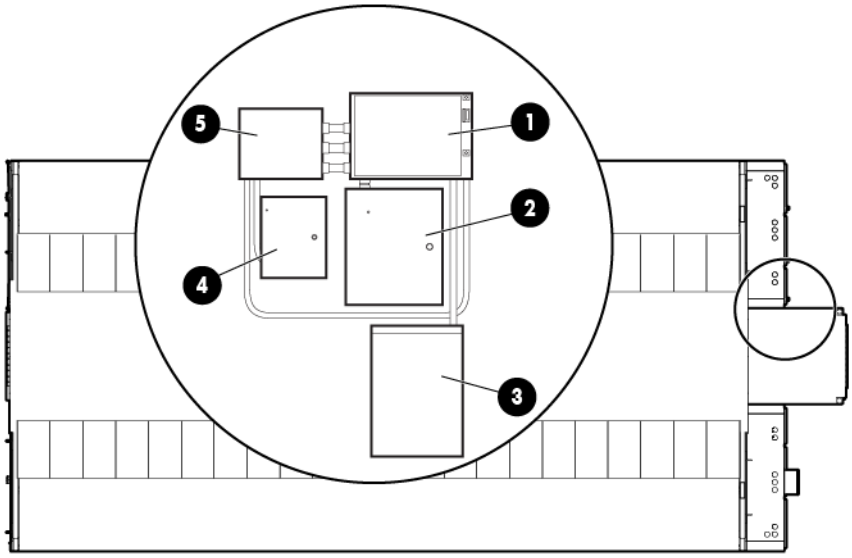
Item	Component	Description
1	VESDA air sampling smoke detection unit	An early warning laser scan smoke detection unit
2	Fire system junction box	Junction box to connect the IT section B fire system to IT section A
3	UPS	Provides backup power to the IT section B VESDA in the event of power loss to the HP POD 240e NA
4	DIN rail with EPO modules	Sends a signal to all of the connected EPO devices For more information, see "EPO system (on page 19)."
5	DIN rail with terminals and ECS communication modules	Sends information from IT section B to the PLC in IT section A
6	DIN rail with terminals and fuses	Sends information from IT section B to the PLC in IT section A
7	240/120V transformer	Provides house power to IT section B for convenience outlets

For more information about the specific control components within the control cabinet, see the Operations and Maintenance Manual for the HP Performance Optimized Datacenter 240e North America (Adiabatic).

Security component identification

The security system components are located in the hot aisle porch.

Top view shown



Item	Component	Description
1	Security panel and Mag lock power supply	Provides power for the security panel and the personnel access door Mag locks
2	Security card access door termination	Controls card readers on the personnel access doors
3	Security card access battery backup	Provides battery backup for the card readers on the personnel access doors
4	Main security controller board	Controls all security components
5	Cross connect for IT section A and B doors	Provides power and sends signals to the installed access control components

Racks

The HP POD 240e NA has 22 IT racks per IT section, for a total of 44 IT racks per HP POD 240e NA.

△ **CAUTION:** If any racks contain empty RU space, use the HP POD 240e NA filler panels to maintain the efficiency of the HP POD 240e NA thermal system. Filler panels are available from HP in 10-pack quantities (part number AQ682A) and 100-pack quantities (part number AS993A).

For more information about racks and network cabling, see the *HP POD 240e NA Networking Guide*.

Life safety systems

Life safety overview

The HP POD 240e NA has multiple life safety systems that work together to protect the HP POD 240e NA equipment and personnel. The following life safety systems are included on the HP POD 240e NA:

- EPO system (on page 19)
- Fire detection system (on page 22)
- Emergency egress (on page 24)
- Facility connections to ECS ("Facility connections to the ECS" on page 35)

EPO system

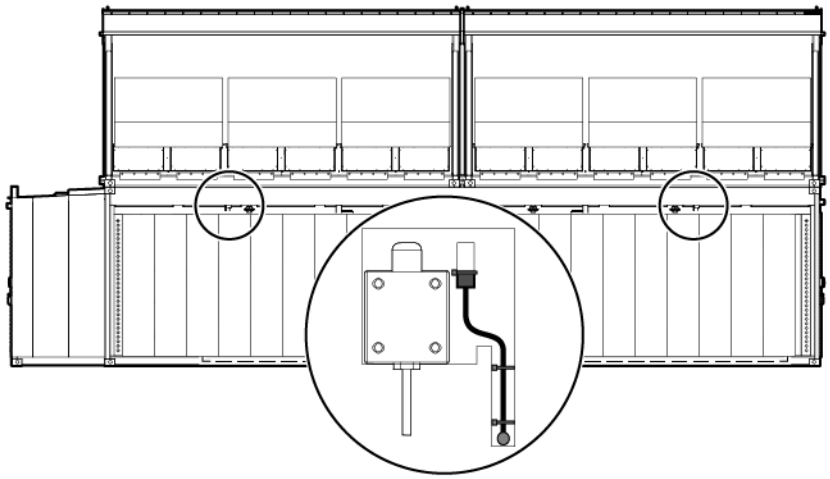
If the HP POD 240e NA must be shut down during an emergency, the EPO system automatically powers off the HP POD 240e NA, activates the EPO indicator on the ECS panel door, and changes the EPO status light tree that is located on the POD exterior to red.

To be sure that all rack-mounted UPS devices are shut down during an EPO event, verify that each rack-mounted UPS device is connected to the HP POD 240e NA EPO system.

The EPO system can be activated two ways:

- Excessive high temperature in the hot aisle—The HP POD 240e NA includes two thermisters. If both thermisters reach 60°C (140°F), an EPO shutdown is triggered automatically.

Side view



- Manual initiation—To manually trigger an EPO shutdown, press any of the EPO buttons. There are EPO buttons located next to the personnel access doors in the POD.

  For the location of EPO buttons, see "Life safety component identification (on page 10)."

IMPORTANT: The EPO system must be reset before you can power up and restart the HP POD 240e NA.

To reset the EPO system:

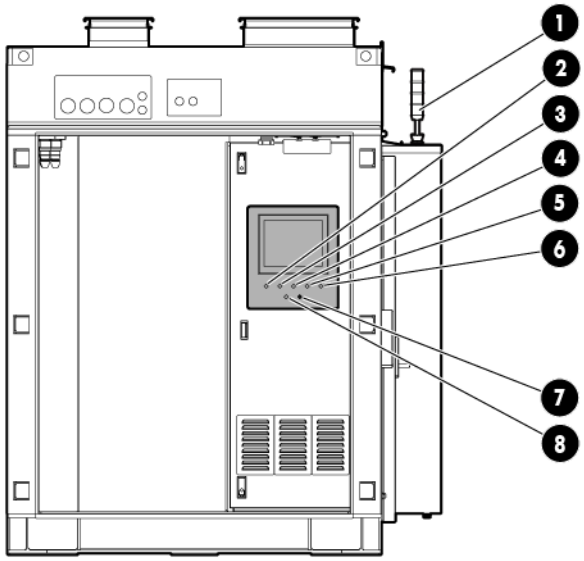
1. Determine and correct the reason for EPO system initiation.
2. If the EPO was triggered manually, the EPO button that was pushed must be reset by rotating the button as indicated.
3. Verify the key control for the EPO mode is in the **Armed** position.
4. Press and release the white EPO reset button.

ECS touchscreen and EPO indicators

The ECS touchscreen and EPO indicators are located on the IT section A control panel door.

The touchscreen enables easy configuration of environmental parameters and access data, and also monitors environmental, life safety, and security conditions within the HP POD 240e NA.

The EPO indicators provide the EPO status and enable the EPO system mode to be adjusted.



Item	Component	Indicator color	Description
1	External EPO status indicator	• White—Normal operating mode • Yellow—Bypass operating mode • Red—EPO shutdown mode	Indicates the operating status of the HP POD 240e NA
2	Power on	White	Indicates the EPO power status
3	EPO shutdown	Red	Indicates an EPO shutdown or alarm condition
4	EPO armed	White	Indicates the EPO system is armed and operational
5	EPO bypass mode	Yellow	Indicates the EPO is operating in bypass mode
6	EPO bypassed	Green	Indicates that the EPO functionality and shutdown is bypassed

Item	Component	Indicator color	Description
7	EPO mode	Key control	The key control allows you to select the EPO mode: • Armed • Test • Bypass
8	EPO reset	White button	Select to reset the EPO system

EPO modes

The EPO system has three operating modes:

- Armed—The EPO system is armed and operational.
- Test—The EPO system is in test mode and will not power off the HP POD 240e NA in the events that would normally trigger an EPO.
- Bypass—The EPO system is non-operational and will not power off the HP POD 240e NA in any events that normally trigger an EPO.

For more information, see "ECS touchscreen and EPO indicators (on page 20)."

The illuminated external EPO status indicator displays the current EPO mode.

- White—The EPO system is armed and operational.
- Red—There has been an EPO event and the HP POD 240e NA is shutdown.
- Yellow—The EPO system is operating in test mode.

EPO accidental activation

To help prevent accidentally pressing the EPO button and activating the EPO system, each EPO button is covered with a clear Lexan cover.

Battery backup during an EPO event

The following components are equipped with a UPS to help be sure that service is not interrupted during a loss of power to the HP POD 240e NA:

- Environmental control system (on page 34)
- VESDA air sampling smoke detection system (on page 22)
- Fire detection system (on page 22)
- Lighting (on page 33)

IMPORTANT: All critical IT UPS devices with batteries that exceed 700VA must be connected to the HP POD 240e NA EPO system, to be sure that the UPS batteries are disconnected during an EPO event. For more information about connecting UPS devices to the EPO system, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Fire detection system

Each HP POD 240e NA is equipped with a fire alarm panel that is integrated with the fire detection system.

The fire system is designed as a stand-alone system, but the system can also interface with customer site fire alarm systems. Customer site connections are the responsibility of the customer. Consult with HP for connection locations.

The fire protection system includes:

- VESDA air sampling smoke detection system (on page 22)
- Manual fire pulls (on page 22)
- Fire alarm panel (on page 23)
- Fire alarm indicators (on page 23)

VESDA air sampling smoke detection system

CAUTION: Excess dust within the HP POD 240e NA can cause the VESDA smoke detector to trigger a fire alarm.

The VESDA system features a single zone laser scan early warning smoke detector to provide the earliest warning of a potential fire.

The orange VESDA piping that runs throughout the HP POD 240e NA includes inlets for smoke sampling. The VESDA uses a high-efficiency aspirator to continuously draw in air from the HP POD 240e NA and circulate the air through a dual-stage filter:

- Stage 1—A filter removes dust and dirt from the air sample.
- Stage 2—An ultra-fine filter removes remaining contaminants in the air sample.

After the air passes through the dual-stage filter, it enters a calibrated detection chamber where a laser scans the air sample for the presence of smoke. The VESDA system cycles through two levels if smoke is detected:

- Level 1—Smoke concentration reaches the first setpoint, and the VESDA system sends an alarm signal indicating that a fire might exist.
- Level 2—Smoke concentration reaches the second setpoint, and the VESDA system indicates that a fire exists in the HP POD 240e NA.

IMPORTANT: The VESDA filter must be changed regularly to be sure that smoke detection readings are accurate. For more information about changing the VESDA filters, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Manual fire pulls

The HP POD 240e NA has six fire pulls; two in each aisle. They are located in the life safety switch cabinet next to each personnel door of the HP POD 240e NA.

Manually activating a fire pull does the following:

- Triggers a fire alarm
- Activates the fire alarm system horn and strobe lights

Fire alarm panel

The fire alarm panel is located in the control cabinet in IT section A and receives signals from the VESDA or manual fire pulls if an alarm condition exists. If an alarm condition does exist, the fire alarm panel activates the fire alarm indicators and sends a signal to the site fire alarm system, if installed.

The fire alarm panel also has a battery backup system that provides backup power to the fire detection system in the event of power loss to the HP POD 240e NA.

The control panel includes the following components:

- Alarm status LED
- Trouble status LED
- Input status LED
- Output status LED
- Acknowledge button
- Alarm Silence button
- System Reset button

Fire detection sequence of operations

There are two initiation sequences for the fire detection system, automatic (VESDA) initiation and manual initiation. The fire strobe light is activated by either initiation sequence.

The fire alarm horn will sound in a temporal mode for any VESDA or manual fire pull initiation.

The fire system operator panel indicates which initiation sequence is active, using the indicator lights and a panel alarm. These signals are also available to the site BMS system, if they are connected.

VESDA initiation

When smoke is detected, the VESDA fire detection system cycles through two levels, as described below.

- Level 1—Indicates the potential for a fire is present. The strobes illuminate and the horns sound.
- Level 2—Indicates that a fire exists. VESDA level 1 might have be reached; the strobes illuminate and the horns sound.

Manual initiation

Manual initiation triggers the fire alarm, causes the fire strobe lights to illuminate, and sounds the horn.

Fire alarm indicators

Upon activation of a fire alarm within the HP POD 240e NA, the following alarms alert personnel:

- Strobe lights
  - Internal—The HP POD 240e NA has three fire strobe lights; one in each aisle.
  - External—The HP POD 240e NA has two fire strobe lights; one on each side.
- Audible horn—The HP POD 240e NA has three horns; located with the three internal strobe lights
- Alarm within the ECS

Emergency egress

The HP POD 240e NA includes the following features for life safety egress on all access doors:

- Exit signs
- Panic bar
- Door strikes
  - Standard hardware—Door strikes
  - Optional hardware—Electric door strikes

Each personnel door includes a standard panic bar to be sure there is a safe exit. Any of the optional egress hardware that is included in the HP POD 240e NA (including electric panic bar, electric strikes, and magnetic locks) are tied to the fire alarm to enable uninhibited egress in the event of an emergency.

Power, electrical, and controls

Site electrical system

To be sure that the POD solution is completely and safely integrated with your facility, HP requires that you complete the following actions for the installed electrical system prior to the installation of the HP POD solution:

- Short circuit analysis
- Arc flash study
- Circuit breaker coordination study

These actions must be performed for all associated parts of the electrical power train. The majority of the details and factors that are required to complete these studies are associated with the existing installed facility infrastructure.

CAUTION: Failure to complete these studies can cause serious issues with the electrical integration of the POD into your electrical system.

Power safety

WARNING: To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 240e NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

Grounding and bonding

WARNING: To avoid the risk of personal injury or electric shock, the HP POD 240e NA must be properly earthed (grounded), and each of the individual sections must be bonded together per NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).

The HP POD 240e NA must be properly earthed to be sure that a common return path for electric current exists, limit the build-up of static electricity, and absorb an unlimited amount of current without changing its potential. To properly ground the HP POD 240e NA to the earth, you must connect the POD to building steel, a ground rod, or a properly installed ground well that is connected to a building's grounding system. The grounding electrode conductor connection point is located on the cold aisle side adjacent to the power cabinet.

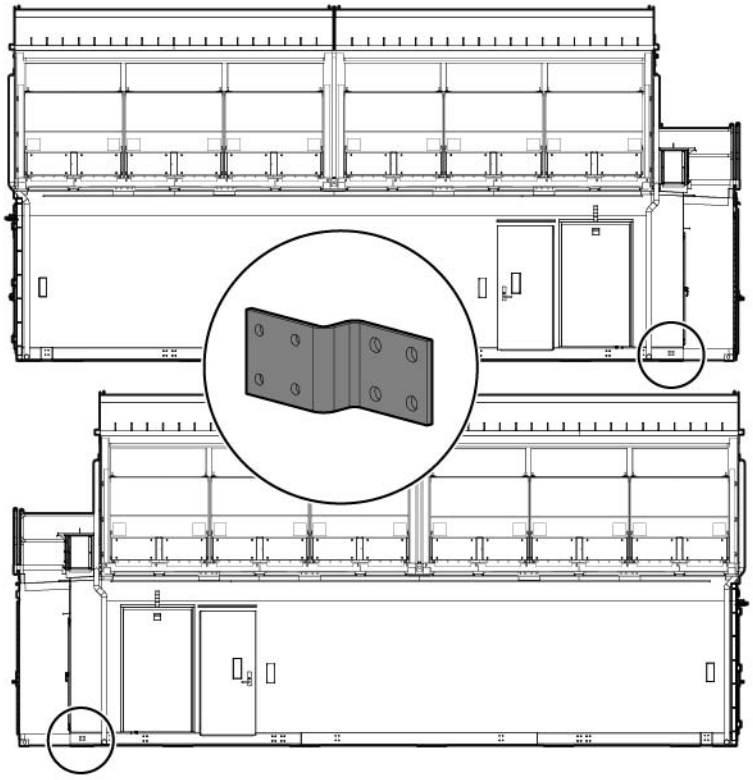
A certified electrician must test and verify the HP POD 240e NA is properly grounded.

Grounding

The HP POD 240e NA includes the following types of grounding.

Earth ground

Side view shown



Bonding

All structural sections of the HP POD 240e NA are bonded by connecting all metallic, non-current carrying items throughout the HP POD 240e NA to protect from electric shock. If all steel-to-steel areas are bonded to one another, each object then has the same electrical potential which ultimately dissipates any high voltage or shock across the entire HP POD 240e NA, minimizing any effects from a lightning strike, per NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).

Lightning protection

The HP POD 240e NA structure and internal components are all bonded together. A common grounding electrode conductor connection point is provided. Proper bonding and grounding of the HP POD 240e NA minimizes the effects of a lightning strike. A surge protection device is provided on the HP POD 240e NA input connection to protect the HP POD 240e NA electrical system from voltage transients. If your site is in an area that is subject to frequent lightning strikes, the HP POD 240e NA must be protected in accordance with NFPA 70 (NA) and IEC (EMEA and APJ). HP recommends that you contact a certified lightning protection consultant.

Capacities

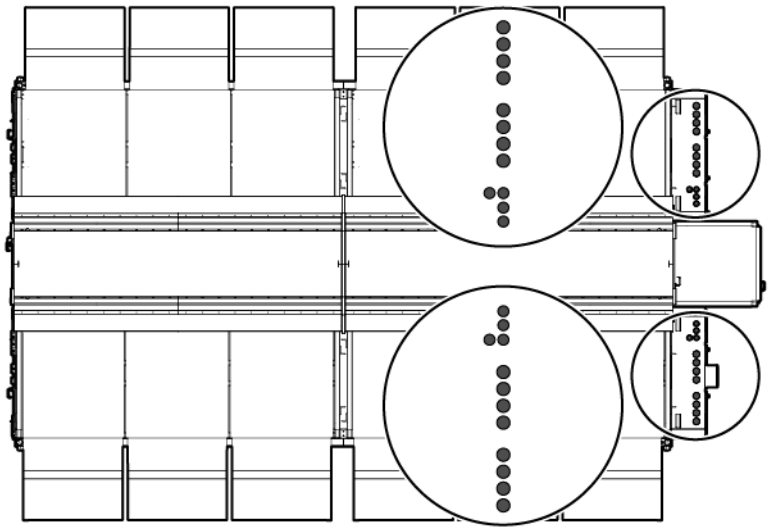
Each HP POD 240e NA is unique and the specific power and cooling capacities vary for each POD that uses Adiabatic cooling. For specific capacity information, see your *HP Performance Optimized Datacenter 240e NA Customized Supplement*.

Power feeders

IMPORTANT: A licensed electrician must connect the power according to all local and national electrical codes, and must comply with manufacturer specifications.

Twenty-four power feeder couplings, twelve per IT section, provide the entrance for power to the HP POD 240e NA. The power feeders route into the top of each electrical panel on the end of the HP POD 240e NA.

Top view shown



The twenty-four power couplings are identified as either main power couplings or Adiabatic mechanical power couplings.

Main power couplings

- Each of the four main power panels contains four power feeder couplings, for a total of sixteen main power couplings.
- Each main power coupling has a 10.16 cm (4 in) diameter.

Adiabatic mechanical power couplings

- Each of the two Adiabatic power panels contains four power feeder couplings, for a total of eight Adiabatic mechanical power couplings.
- Each Adiabatic mechanical power coupling has a 7.62 cm (3 in) diameter.

Power feeders are sized in accordance with NEC and IEC regulations.

Electrical panel labels

WARNING: To avoid the risk of personal injury or loss of life, all personnel must comply with PPE requirements when opening or working inside areas of the HP POD 240e NA that are marked as hazardous voltage, per NFPA 70E in accordance with NEC (NA) and IEC (EMEA and APJ).

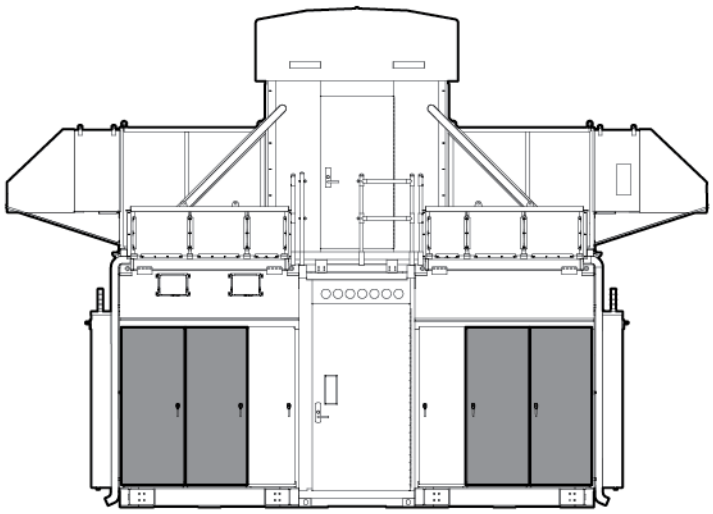
⚠ **WARNING:** To avoid the risk of personal injury or loss of life, all personnel must comply with electrical warning labels when operating and maintaining the electrical panels and systems of the HP POD 240e NA.

For the external electrical power component locations, see "Electrical power component identification (on page 13)."

Power distribution: electrical busway system

Each IT section of the HP POD 240e NA is protected by an electrical circuit breaker panel located on the end of the HP POD 240e NA.

End view shown



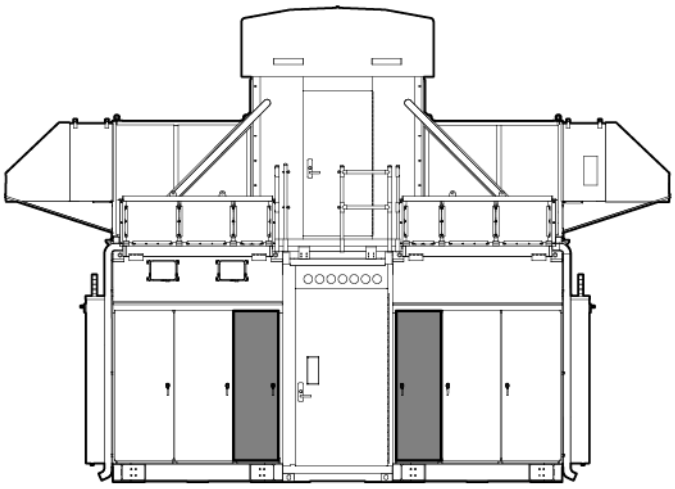
The following specifications are for each IT section electrical circuit breaker panel.

Feature	Specification
Number of busways	8
Frequency	60 Hz
Amps (per busway)	200A
Voltage (per busway)	415V, wye
Grounding	Copper
Busway conductors	3-phase + neutral + equipment ground

Power distribution: Adiabatic system

The Adiabatic units are powered and protected by an electrical circuit breaker panel located on the end of the HP POD 240e NA. Within each AHU electrical cabinet, there are two panels that provide power to the Adiabatic units.

End view shown



Feature	Specification
Frequency	60 Hz
Amps	125A
Voltage	415V, wye
Grounding	Copper
Feeder conductors	3-phase + equipment ground

Panel schedules

The panel schedule for each electrical panel is permanently affixed to the inside cabinet door of each electrical panel.

Wire color code

IMPORTANT: The use of UL-approved colored tape over another color of wire is only acceptable on wire sizes #2 and larger.

120 Volt Wiring System—Power required for the transformer in control cabinets

Wire color	Description
Black	Single-phase current carrying conductor
White	Neutral
Green or green and yellow	• Equipment grounding conductor • Bonding conductor • Earth ground

415 Volt Wiring System—Power required for electrical busway feeders

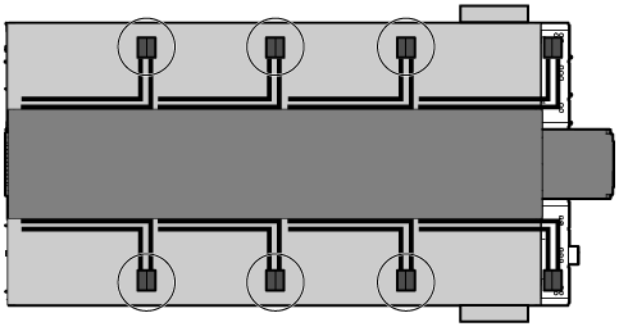
Wire color	Description
Brown and violet	A Phase

Wire color	Description
Orange and violet	B Phase
Yellow and violet	C Phase
White and violet	Neutral
Green or green and yellow	• Equipment grounding conductor • Bonding conductor • Earth ground

Electrical busways

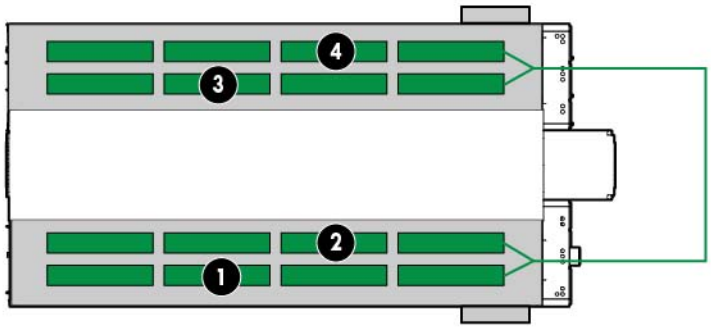
The electrical busway is a modular, overhead electrical distribution system that supplies power to the HP POD 240e NA IT loads. The HP POD 240e NA has a total of sixteen busways, eight per IT section. Each busway can support 200 amps.

Top view shown



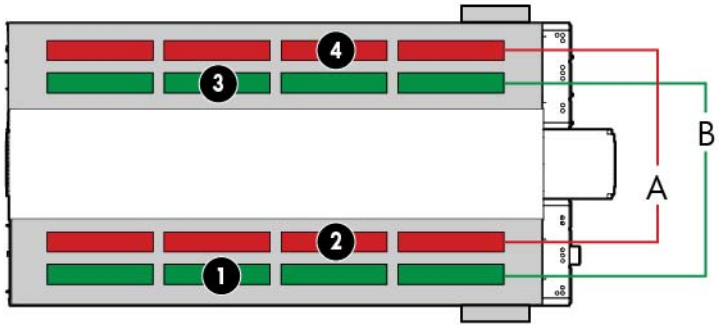
The HP POD 240e NA electrical busways can be configured for either non-redundant power or redundant power. The HP POD 240e NA can be installed as a single source 1N load by providing all required feeders from one common power sources and from common switchboards and transformers. A fully redundant 2N installation is configured by feeding the parallel power paths from independent power sources, switchboards, and transformers.

- **Non-redundant power installation (1N load)**—All four main input connections are powered from the same power source.



Callout	Component	Power source
1	IT section A, Busway #1	Power source #1
2	IT section A, Busway #2	Power source #1
3	IT section B, Busway #1	Power source #1
4	IT section B, Busway #2	Power source #1

- **Redundant power installation (2N load)**—Each main input connection to the HP POD 240e NA is powered from parallel power paths from independent power feeds.

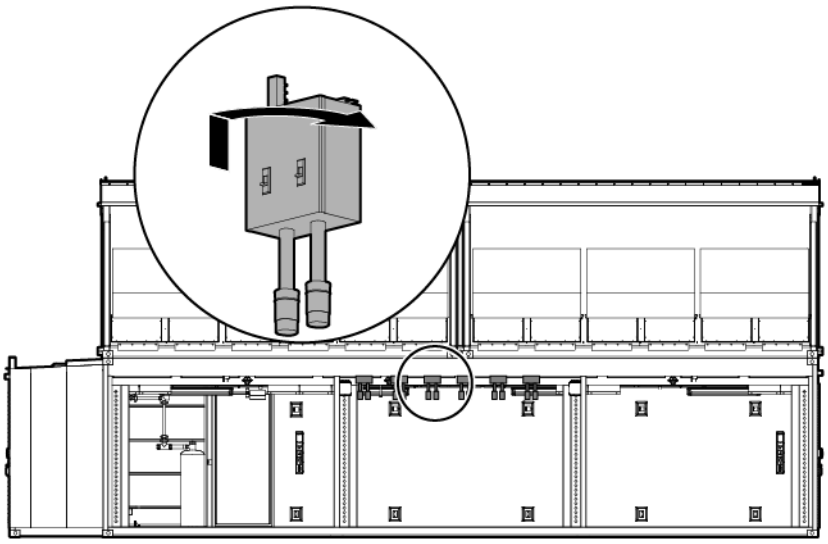


Callout	Component	Power source
1	IT section A, Busway #1	Power source #1
2	IT section A, Busway #2	Power source #2
3	IT section B, Busway #1	Power source #1
4	IT section B, Busway #2	Power source #2

Drop boxes

The internal electrical busways provide a location to connect each of the drop boxes, which then power the PDUs. For each IT section, stagger the drop boxes on the electrical busways by connecting one drop box to busway #1 and connecting the next drop box to busway #2. A staggered configuration allows for load balancing with the rack equipment and is necessary to create redundancy.

Side view shown



Disabling power

- To disable power to a single PDU, open the drop box breaker feeding that PDU and disconnect the PDU from the drop box.
- To disable power to a single rack, open the corresponding breakers on the drop boxes feeding each of the PDUs installed in that rack.
- To disable power to a single electrical busway, open the appropriate breaker for that busway on the corresponding electrical busway panel outside of the HP POD 240e NA.
- To disable power to all racks on the A-side busways, open each breaker for each busway on the corresponding electrical panel outside of the HP POD 240e NA.

Rack power

Power is provided to each rack by PDUs and drop boxes. The PDUs are powered by the drop boxes attached to each electrical busway. For more information about electrical busway drop boxes, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Feature	**Specification**
Rack type	HP POD 240e NA rack
Max number of racks	44 (22 per IT section)
Max U space per rack	50U
Max U space per HP POD 240e NA	2,200U
Total number of PDU's	88 (2 per rack)

Feature	Specification
Max power per PDU	30 A = 17 kW; 60A = 34 kW
Average capacity per rack	30 kW
Peak capacity per rack	69.12 kW
Voltage to rack	240V
Rack configuration	Redundant/Non-redundant capabilities

Lighting

The HP POD 240e NA includes lighting in each section:

- IT section A—four LED lights and two emergency lights
- IT section B—four LED lights and two emergency lights
- Hot aisle—six LED lights and two emergency lights
- Service aisle—four fluorescent lights

A light switch is located at every personnel door. For more information about light switch locations, see "Life safety component identification (on page 10)."

The IT sections and the hot aisle LED lights are tied to battery backup power, so the emergency lights will activate to keep the interior of the HP POD 240e NA illuminated during a power outage or emergency.

For more information about lighting, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Environmental control system

Environmental control system overview

The ECS is a stand-alone control system developed for the HP POD 240e NA. The ECS does not require external connections with an external site system, BMS, public or private internet site, cloud, or wireless system to control the POD operation properly.

The ECS is designed to use Modbus TCP/IP connections to retrieve a variety of data. These capabilities connect to the stand alone ECS system to monitor the operating parameters of the POD at your expense. It is your responsibility (or your representative's or agent's responsibility) to integrate this communication capability into any existing BMS or monitoring system.

CAUTION: To be sure that alarm conditions can be identified and resolved, HP recommends that you remotely monitor all alarm conditions. Failure to monitor the alarm conditions can cause delays in appropriate action during an alarm condition.

Using the ECS

HP recommends connecting the HP POD 240e NA to your facility BMS and establishing communication through the Ethernet cable connected to the external communications box. For more information, see "Configuring the ECS (on page 38)."

The HP POD 240e NA ECS is a Microsoft Windows-based system.

The standard ECS protocol, Modbus TCP/IP, is a data communication protocol for building automation and control networks. Connecting across different protocols might require additional engineering labor and coordination between your in-house control manufacturer and HP. It is your responsibility to make the connection between the HP POD 240e NA and a BMS system.

The ECS provides the following:

- A supported communication interface that can remotely monitor and control certain HP POD 240e NA components.
- Immediate notification of all supported alarm messages.

By connecting your HP POD 240e NA to a BMS system, you can monitor the various parameters and alarms. For more information, see "Navigating the ECS interface (on page 42)." The complete list of parameters and alarms that can be monitored will be discussed with your facilities personnel.

IMPORTANT: If your site does not have a BMS, HP POD 240e NA ECS data can be sent to and viewed from a set of IP addresses on a host computer. The ECS communicates through an Ethernet cable connected to the demarcation box (on page 67).

Components of the ECS

The ECS system uses several of the POD components throughout the HP POD 240e NA to maintain the proper environmental conditions required within the HP POD 240e NA. The following components monitor and report information to the ECS:

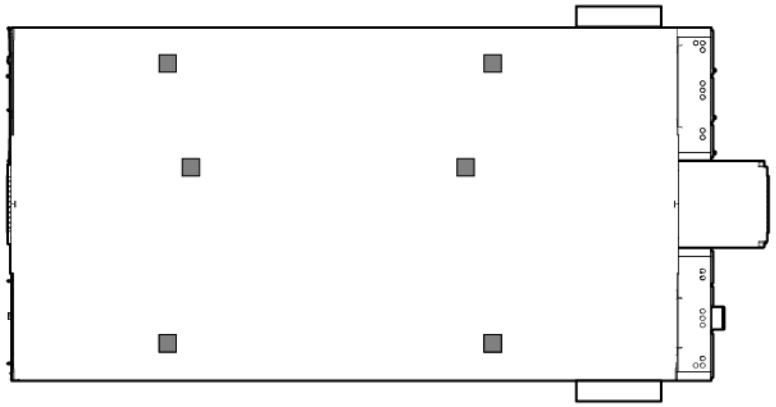
- AHU
- Dampers and actuators
- Electrical system
- Exhaust fans
- Humidity sensors
- Pressure sensors
- Temperature sensors

Satellite control boxes

The satellite control boxes are used as connection points for communication from the environmental sensors back to the ECS control panel. Each satellite control box is configured for a different purpose, depending on the needs of the IT equipment communicating through it.

The HP POD 240e NA has six satellite control boxes.

Top view shown



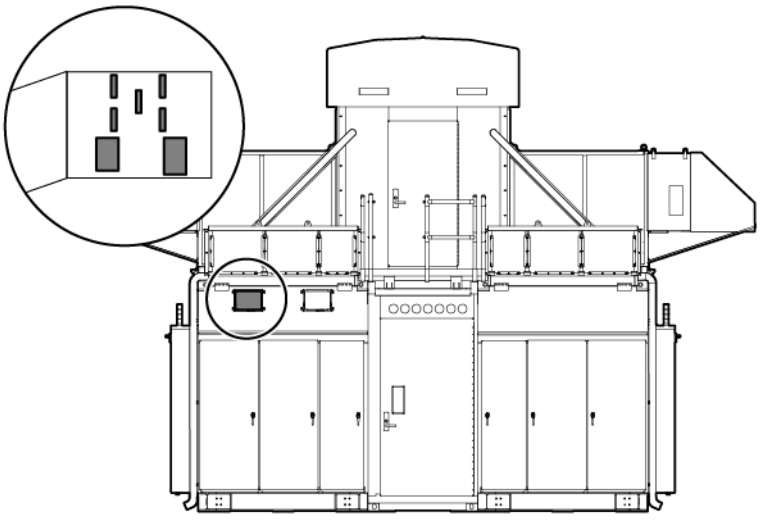
Facility connections to the ECS

The ECS can connect to an established network using the RJ45 in the demarcation box (on page 67), or using the cables that are hard-wired through the connection portals on either end of the HP POD 240e NA. The system uses Modbus TCP/IP for communication.

Connecting to the ECS through the demarcation box

To connect the network to the ECS control panel, route an Ethernet cable to the appropriate RJ45 connector inside the HP POD 240e NA demarcation box (on page 67).

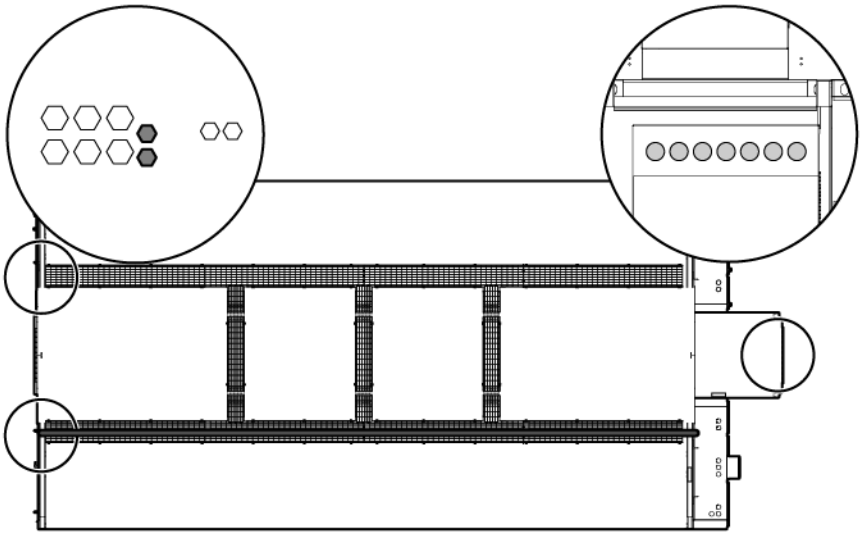
End view shown



Connecting to the ECS through connection portals

To connect an established network to the ECS control panel of the HP POD 240e NA, bring an Ethernet cable through the IT portals on either end of the HP POD 240e NA, route it through the cable tray, and then connect it directly to the ECS panel.

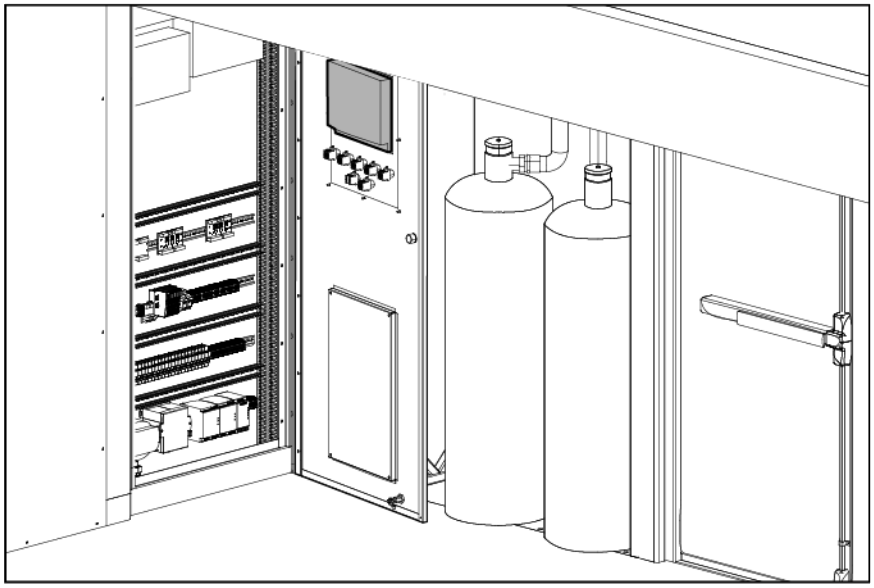
Top view shown



Managing the ECS from the HP POD 240e NA

The ECS interface is viewed directly from the ECS screen on the IT section A control cabinet door. For more information, see "ECS touchscreen and EPO indicators (on page 20)."

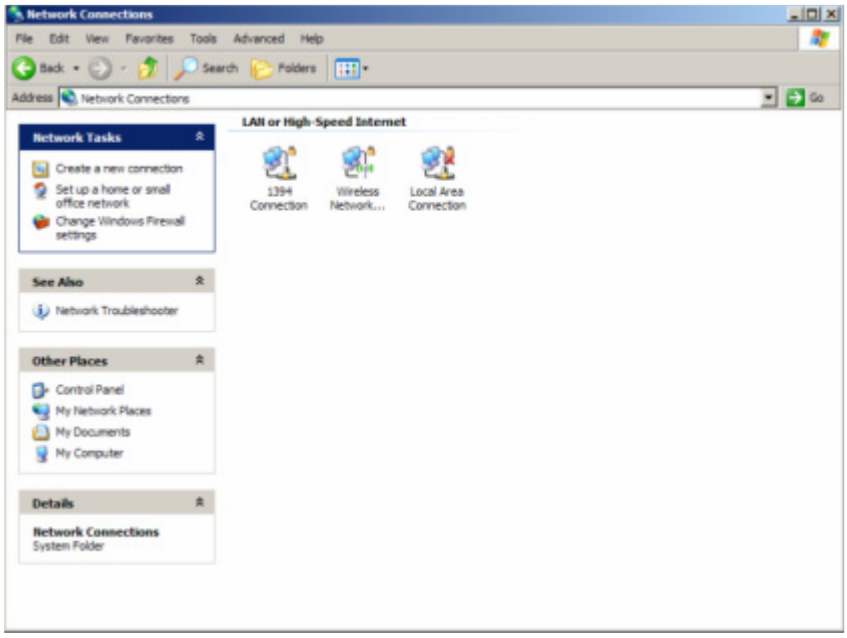
To access the ECS while inside the HP POD 240e NA you can use a notebook or other customer-provided computer, and connect an Ethernet cable between the notebook and the designated ECS jack.



Configuring the ECS

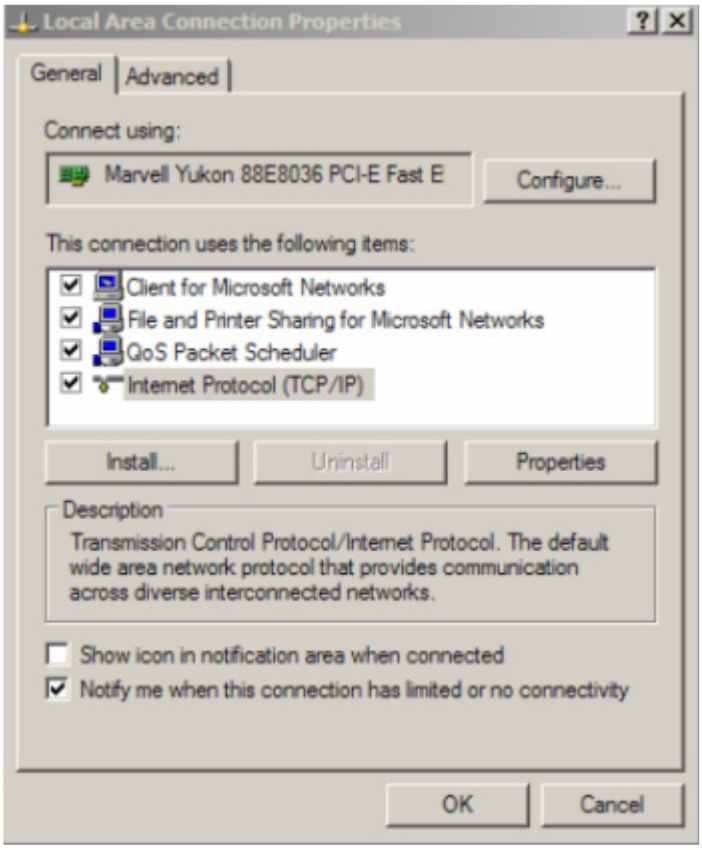
To configure the ECS:

1. Connect a host computer to the ECS. For more information, see "Managing the ECS from the HP POD 240e NA (on page 37)."
2. Configure your computer network settings:
   a. Select **Start>Control Panel>Network Connections**.



   b. Double-click **Local Area Connection**.
   c. Select **Internet Protocol (TCP/IP)**.

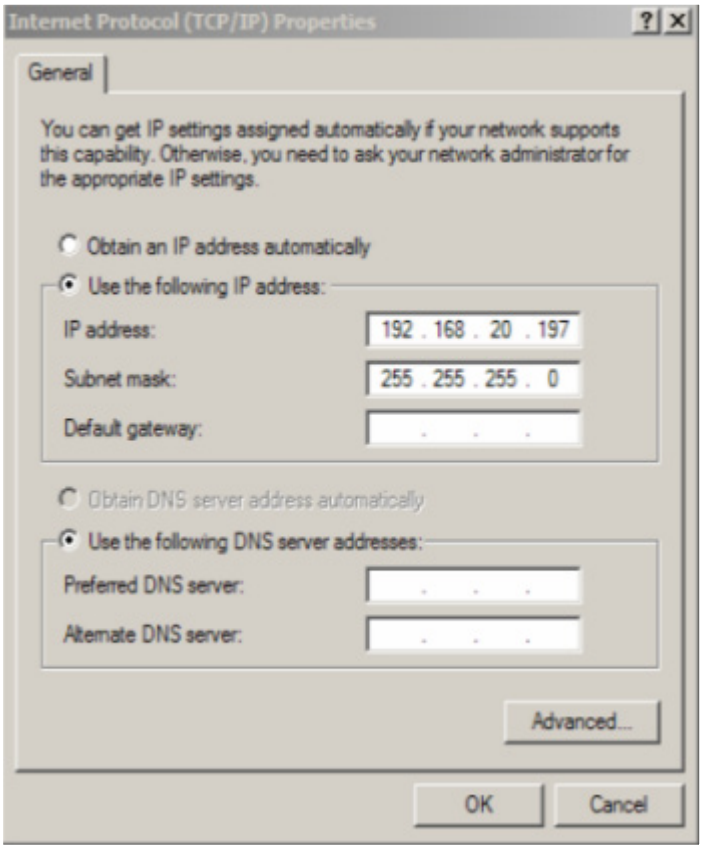
d. Click **Properties**.



e. Select **Use the following IP address**.

f. Enter the new IP address. Be sure to specify an IP address in the same network group as the ECS controller. By default, the ECS controller uses 192.168.20.1. The IP address for your computer can include any number in the subnet from 2 to 254.

g. Click **OK**.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 20 . 197
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

3. Click **OK** to save changes and close the TCP/IP Properties screen.
4. Click **OK** to close the Local Area Connections Properties screen.

Logging in remotely to the ECS

Before you can log in remotely, you must do the following:

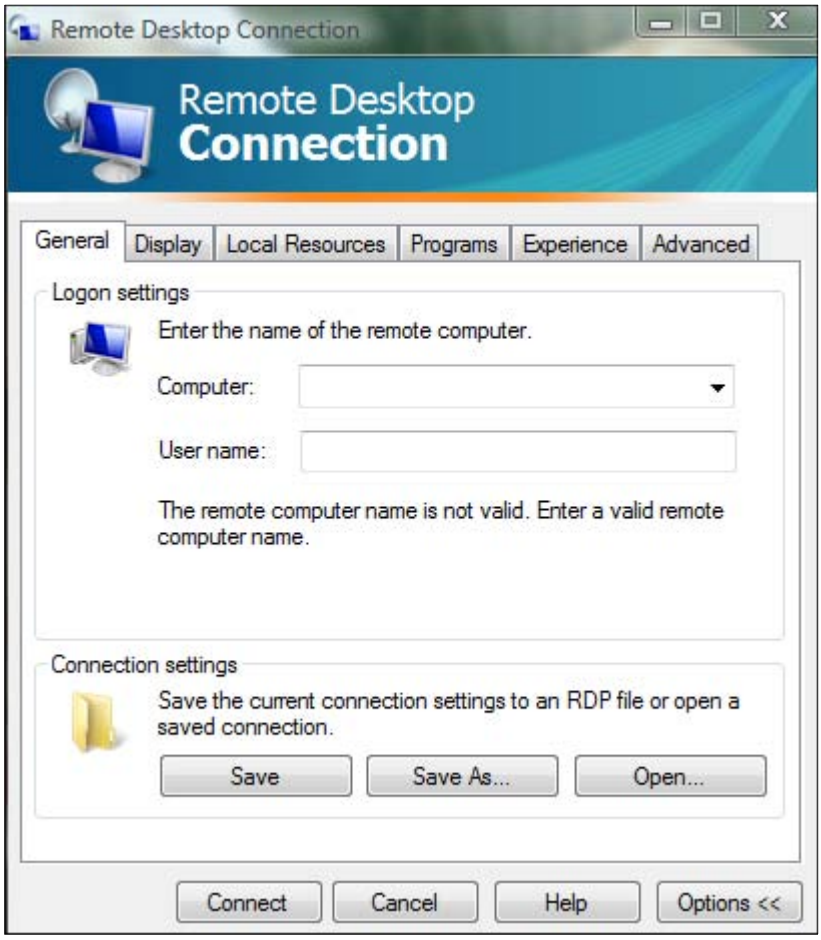
- Add the PLC to a network
- Obtain a username and password
- Obtain the static IP address of the PLC. For more information, see "Locating the ECS IP address (on page 41)."

Use the remote desktop application to log in to the ECS remotely:

1. On the remote computer, select **Start> All Programs> Accessories> Remote Desktop Connection**.
   The Remote Desktop window appears.
2. In the Computer field, enter the IP address for the PLC.
3. In the User name field, enter the user name.

IMPORTANT: When logging in to the Remote Desktop, the default user name is `Administrator` and the default password is `1`.

4. Click **Connect**.



Locating the ECS IP address

IMPORTANT: The ECS has three NIC addresses: 10.10.10.1, 10.10.10.2, and an IP address that is set up by the customer for external communication.

The PLC must be connected to locate the IP address for each NIC. For more information, see "Managing the ECS from the HP POD 240e NA (on page 37)."

To locate the ECS IP address:

1. Select **Start>Run**.
2. Enter `ipconfig`.

   The IP address appears under adapter #3.

-or-

1. Select **Start>Network and Sharing Center**.
2. Right-click Local Area Network.
3. Click the **Support** tab.

   The IP address appears.

Password protected

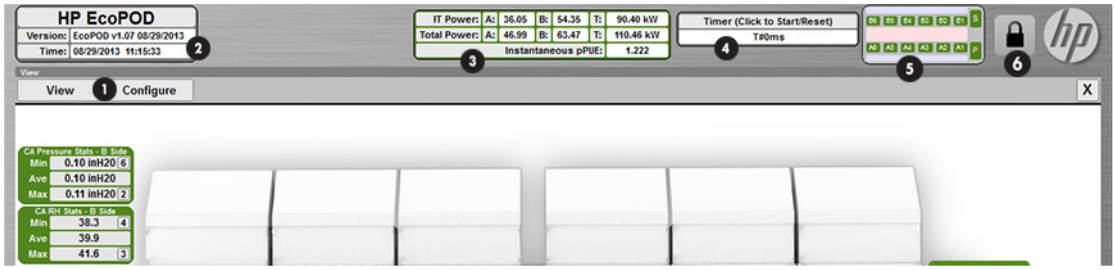
The ECS is password protected and has two levels of security:

- View—Allows read-only access to the ECS system. No password is required for this level of access to the system.
- Customer—Allows you to configure alarm setpoints and Adiabatic control settings. The customer-level password is required for this level of access to the system.

Navigating the ECS interface

The ECS interface provides information for environmental and security conditions You can monitor and configure these conditions from the touchscreen LCD panel on the IT section A control cabinet.

To navigate to different screens in the system, select one of the menu options on the navigation toolbar at the top of the screen.



Callout	Icon name	Description
1	Main menu toolbar	Shows the main menu options available for the password that is entered
2	System information	Provides information on the following: • ECS version • Date • Time
3	Power	Provides IT power and total power information for A-side and B-side power feeds
4	Timer	Allows you to monitor time for functions in the system. To use the timer: • Click the timer to start it. • Click the timer again to reset it.
5	System overview	Indicates the status of the AHU and ECS systems: • Green—The systems are operating within normal parameters • Amber—The systems are operating, but has a notification or a low level warning • Red—The systems have a critical alarm • Gray—Communication to the AHU is lost or the AHU is powered off Navigates directly to the system detail screen when you click the icon

Callout	Icon name	Description
6	Enter password	Allows you to enter a password for greater control in the ECS system

Logging in to the ECS touchscreen

To log in to the ECS touchscreen:

1. Click the lock icon at the top of the screen.

   A keypad appears.
2. Enter your ECS password.
3. Click **OK**.

View

You can see the View menu when you have not entered a password and you have view-only access to the ECS system. If you enter the customer-level password, the View menu allows you to configure alarm setpoints within the ECS system.

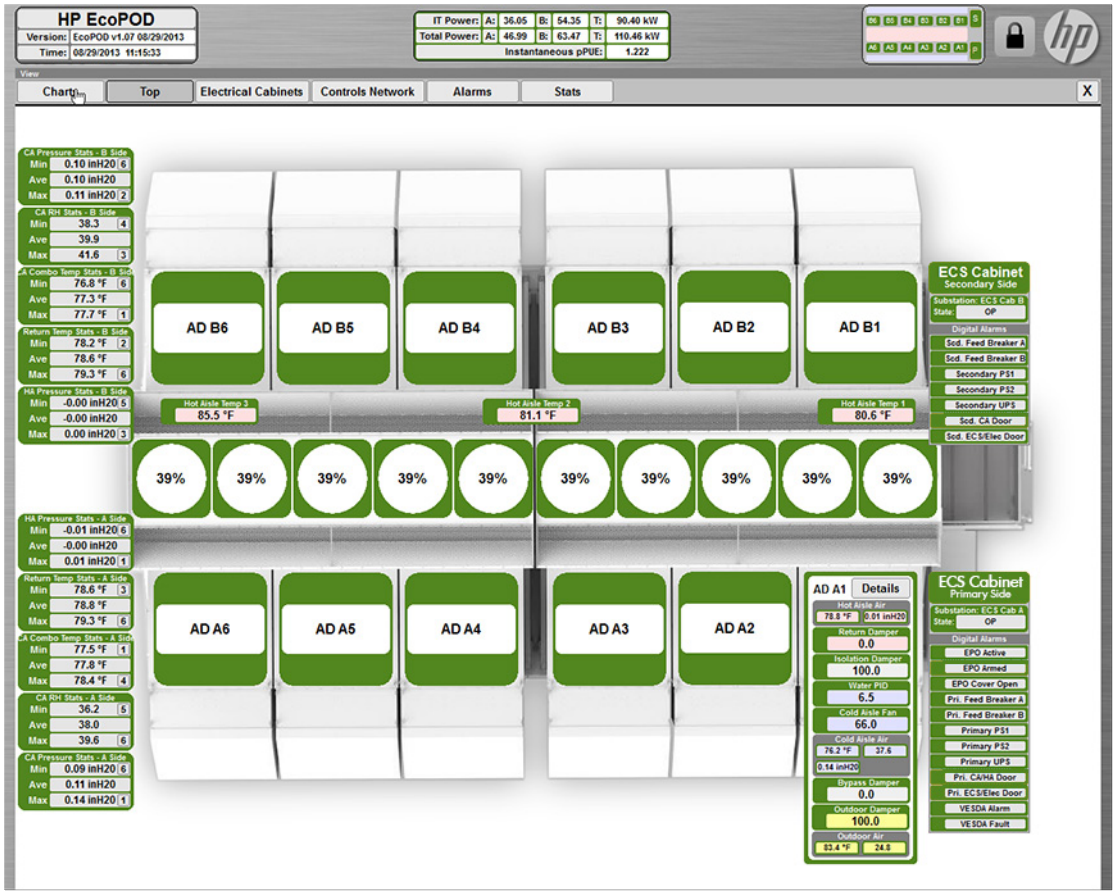
The following screens are on the View menu:

- Top screen (on page 43)
- AD detail screen (on page 45)
- Charts screen (on page 47)
- Electrical Cabinets screen (on page 49)
- Controls Network screen (on page 50)
- Alarms screen (on page 51)
- Stats screen (on page 52)

Top screen

The Top screen opens immediately upon activating the ECS system through the LCD touchscreen display. The screen displays an overview of all the ECS components and the status of each component.

IMPORTANT: The ECS parameters must only be set by qualified service personnel.



The Top screen displays the following information for each IT section.

Information displayed	Description
CA pressure	Indicates the minimum, maximum, and average pressure values for each IT section
CA RH	Indicates the minimum, maximum, and average relative humidity percentages from each IT section
CA combo temperature	Indicates the minimum, maximum, and average temperature values for each IT section
Return temperature	Indicates the minimum, maximum, and average return temperature values for each IT section
HA pressure	Indicates the minimum, maximum, and average pressure values for the hot aisle
Hot aisle temperature	Indicates the hot aisle temperature at three different locations in the hot aisle.
Min and Max value sensor number	Indicates the specific sensor that is reading the minimum and maximum value for each statistic
Fan speed	Indicates the exhaust fan speed percentage

Information displayed	Description
AD detail	Indicates detailed information for each Adiabatic unit: • Hot aisle air • Return damper • Isolation damper • Water usage • Fan speed • Cold aisle air • Bypass damper • Outdoor damper • Outdoor air
ECS cabinet	Indicates the status of the ECS system and displays the following alarm indicators: • EPO • Breaker • Power source • UPS • Door open • VESDA

The ECS component icon colors indicate the component status:

- Green—No alarm conditions exist and the component is operating within normal parameters.
- Amber—A warning alarm condition or notification for that component exists.
- Red—A critical alarm condition for that component exists.
- Gray—A loss of communication for that component exists or an AHU is powered off.

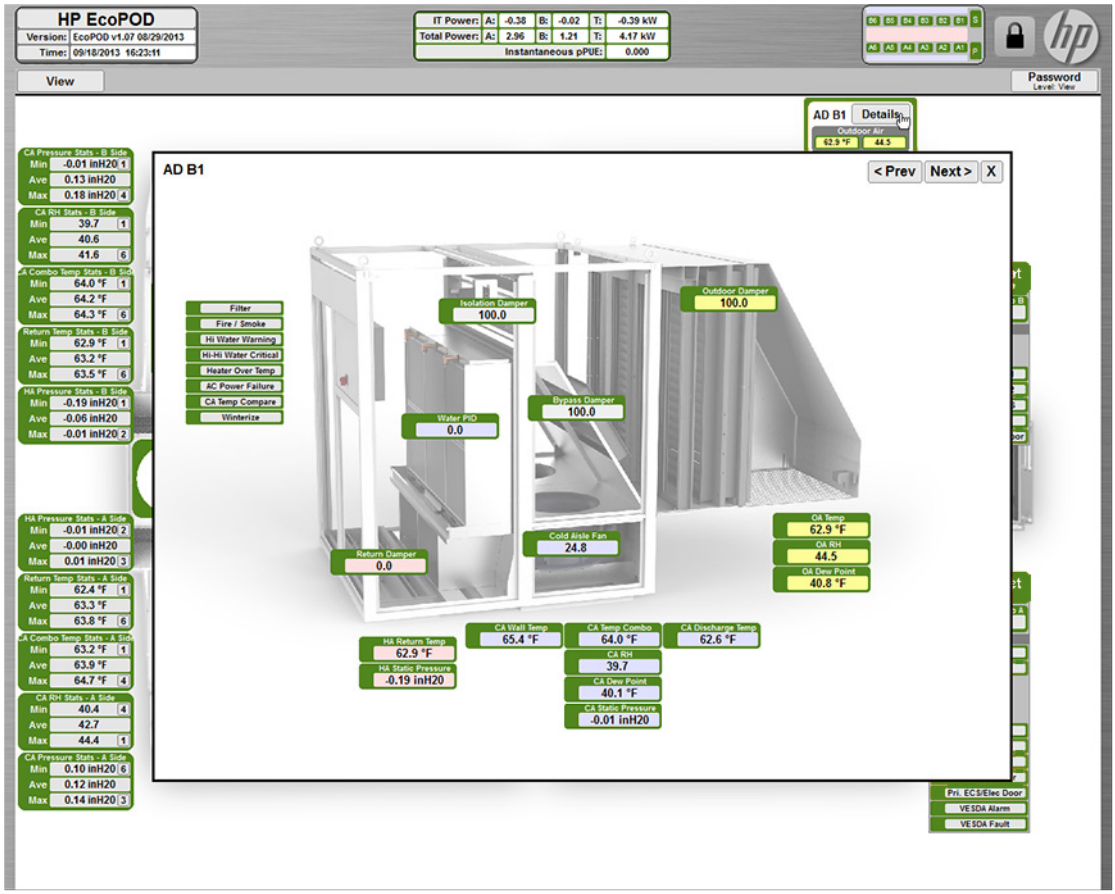
For more information about alarm conditions, see "Alarms screen (on page 51)."

To navigate to another screen, select one of the menu options on the navigation toolbar at the top of the screen. For more information, see "Navigating the ECS interface (on page 42)."

AD detail screen

The AD detail screen displays detailed information for the Adiabatic unit selected. The Adiabatic unit number appears at the top of the screen.

IMPORTANT: The ECS parameters must only be set by qualified service personnel.



The AD detail screen displays the following minimum and maximum alarm setpoint ranges that you can configure:

Setpoint displayed	**Description**
HA return temperature	Indicates the temperature reading from the hot aisle
HA static pressure	Indicates the pressure value reading from the hot aisle in relation to the external ambient temperature
CA wall temperature	Indicates the temperature from the wall sensor located in the IT sections
CA temperature combo	Indicates the average temperature from the wall sensor and discharge temperature sensor
CA relative humidity	Indicates the relative humidity percentage from the wall sensor
CA dew point	Indicates the dew point temperature from the wall sensor
CA static pressure	Indicates the pressure value reading from the IT sections in relation to the external ambient pressure
CA discharge temperature	Indicates the discharge air temperature

The AD detail screen displays the following operational parameters for each AHU:

Operation displayed	Description
Isolation damper	Indicates the position of the isolation damper, 100% means the damper is open
Water PID	Indicates the percentage of full flow water usage
Return damper	Indicates the position of the return damper, 100% means the damper is open
Bypass damper	Indicates the position of the bypass damper, 100% means the damper is open
Cold aisle fan	Indicates the speed of the cold aisle fan
Outdoor damper	Indicates the position of the return damper, 100% means the damper is open
OA temperature	Indicates the OA temperature
OA relative humidity	Indicates the OA relative humidity
OA dew point	Indicates the OA dew point temperature

The AD detail screen displays the following alarm conditions:

Alarm displayed	Description
Filter	Indicates that a filter needs to be changed
Fire/smoke	Indicates fire or smoke is detected
Hi water warning	Indicates water in the Adiabatic drain pan
Hi-Hi water critical	Indicates excessive water in the Adiabatic drain pan
Heater over temperature	Indicates the AHU heater temperature is too high
AC power failure	Indicates the AHU power is in failure
CA temperature compare	Indicates the AHU discharge temperature is in range of the other AHUs in the IT section
Winterize	Indicates the Adiabatic units are operating in Winterize mode

If an alarm condition exists for the Adiabatic unit, the parameter that is out of range will turn amber or red, based on the severity of the alarm condition. For more information about alarm conditions, see "Alarms screen (on page 51)".

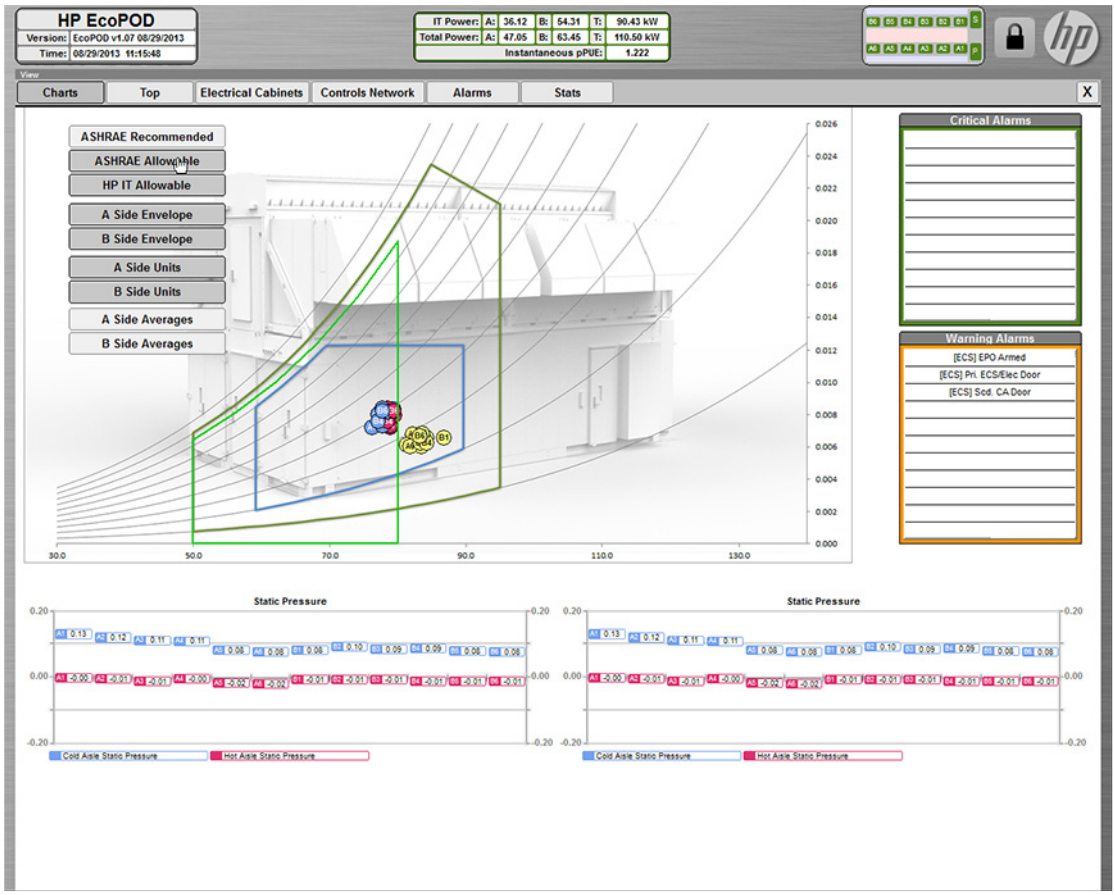
To view the details of another Adiabatic unit, click the **PREV/NEXT** buttons on the top of the screen. These buttons allow you to scroll numerically through all of the Adiabatic units.

Charts screen

The Charts screen displays the following information:

- Psychrometric chart (on page 48)—Displays recommended and operational ranges for the HP POD 240e NA.
- Readings chart (on page 48)—Displays static pressure, temperature, fan speed, water valve, or damper readings.

- Alarms chart (on page 49)—Displays active critical and warning alarms.



Psychrometric chart

The Charts screen displays the range of the POD within psychrometric operating envelopes. The following psychometric operating envelops are available.

Operating envelope	Description
ASHRAE recommended	Displays the recommended ASHRAE operating envelope
ASHRAE allowable	Displays the minimum operating envelope that ASHRAE recommends
HP IT allowable	Displays the recommended HP IT operating envelope
A/B side envelope	Displays the configured operating envelopes for IT section A and IT section B Adiabatic units
A/B side units	Plots the current combination temperature, return air temperature, and outdoor air temperature on the psychrometric chart
A/B side averages	Plots the IT section average combination temperature, return air temperature, and outdoor air temperature on the psychrometric chart

Readings chart

The readings chart at the bottom of the Charts screen displays the following information:

Information displayed	Description
Static pressure	Indicates the cold and hot aisle static pressure readings for each Adiabatic in relation to the external ambient pressure
Temps	Indicates the cold and hot aisle temperature readings for each Adiabatic unit
Fan speed	Indicates the fan speed for each Adiabatic unit
Water valve	Indicates the water valve percentage for each Adiabatic unit
Dampers	Indicates the damper position for each Adiabatic unit

To change the charts that display at the bottom of the screen:

1. Click a chart to bring up the chart menu.
2. Select the information that you want to view.

Alarms chart

The alarms chart displays critical and warning alarms that are active in the system. For more information, see "Alarms screen (on page 51)."

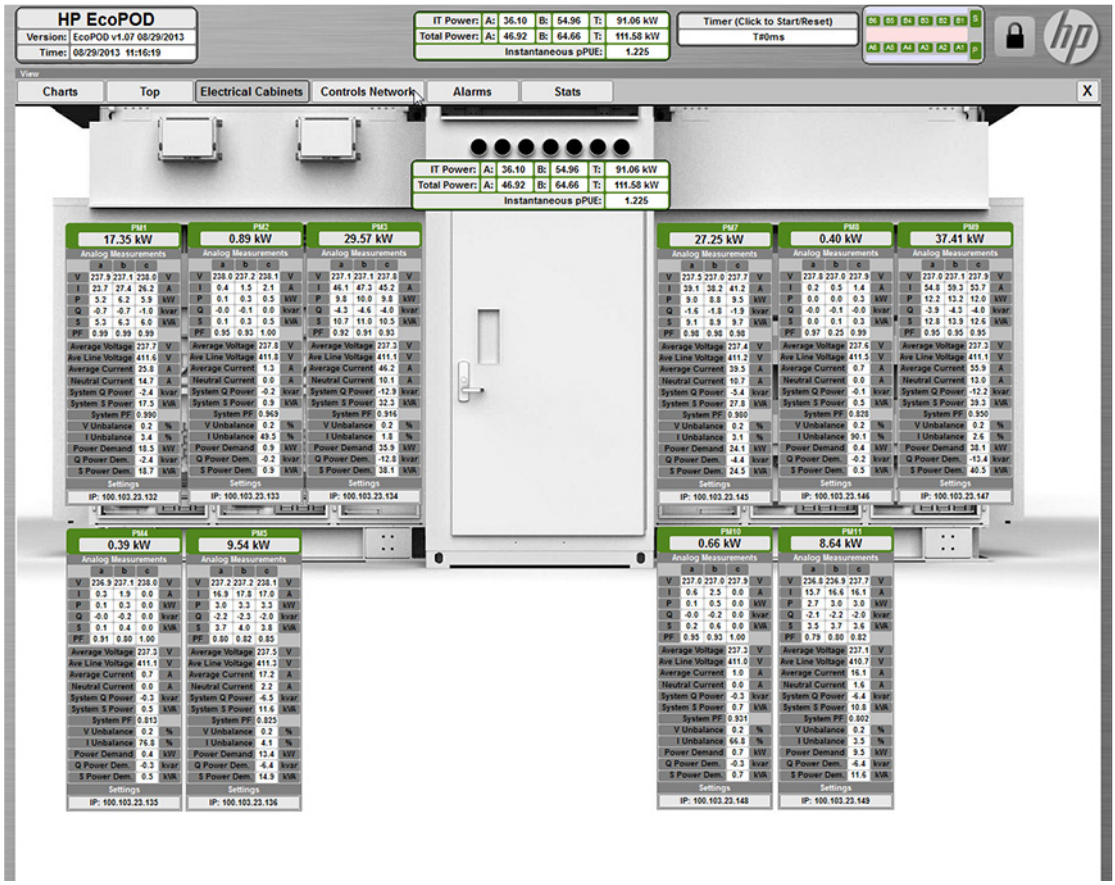
Electrical Cabinets screen

The Electrical Cabinets screen displays detailed power meter information that is monitored from the HP POD 240e NA power input. This screen displays the voltage and current average for all 3-phase electrical feeds. The apparent and real power values are the sum of all 3-phase electrical feeds. The values shown on this screen are included in the PUE calculations for the HP POD 240e NA.

The power information that displays on this screen is read-only and cannot be altered.

Static IP addresses can be viewed from this screen when the customer-level password is entered.

IMPORTANT: The ECS system subtracts the power measurements for the house panel from the Starline power measurements to be sure that the PUE measurements are accurate.



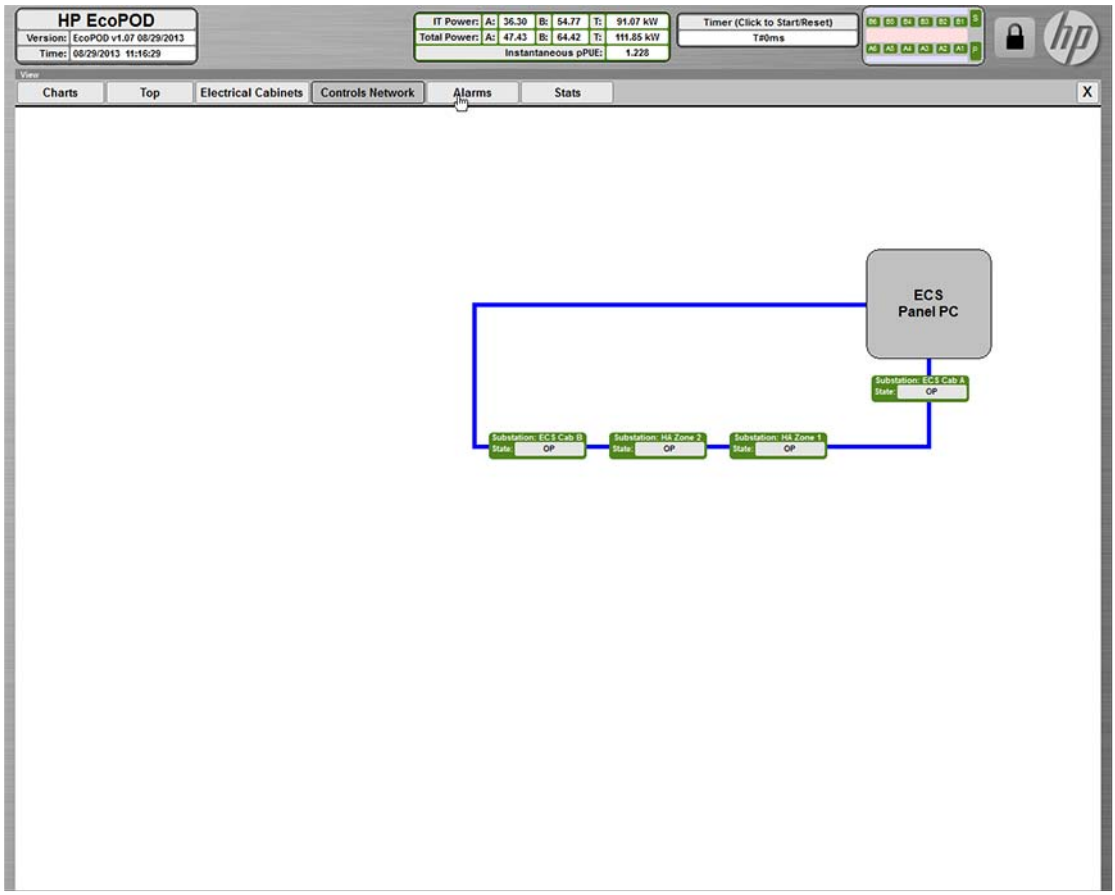
Controls Network screen

The Controls network screen displays the communication path of the four I/O stations that are located throughout the POD. The four I/O stations are linked together and can reverse the flow of communication if operation input fails or there is a no communication alarm condition.

The I/O station component icon colors indicate the component status:

- Green—No alarm conditions exist and the four I/O stations are operating within normal parameters.
- Amber—A communication redundancy loss exists and the link (input or output) that is disconnected displays.

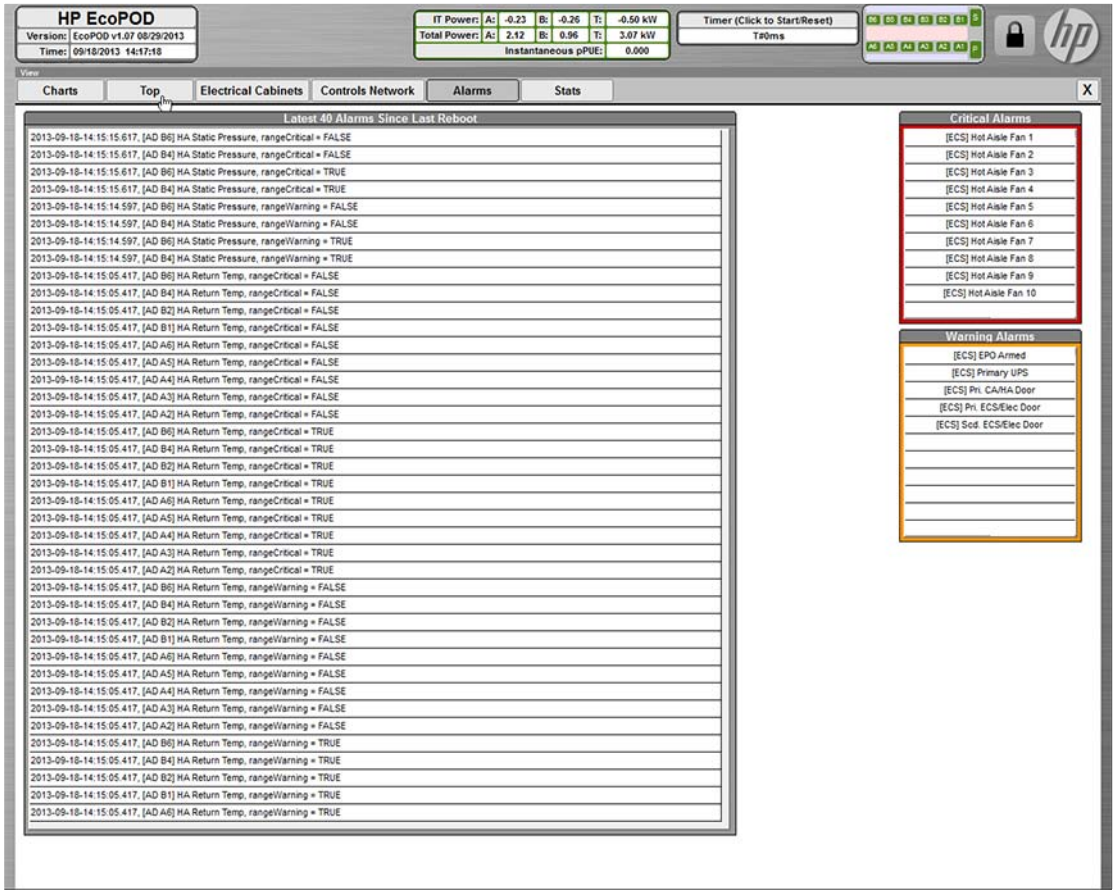
- Red—A complete communication loss exists for both input and output connections.



Alarms screen

The Alarms screen displays a log of up to 40 alarms that have activated since the last ECS system reboot. Any active critical and warning alarms display in the boxes on the right side of the screen.

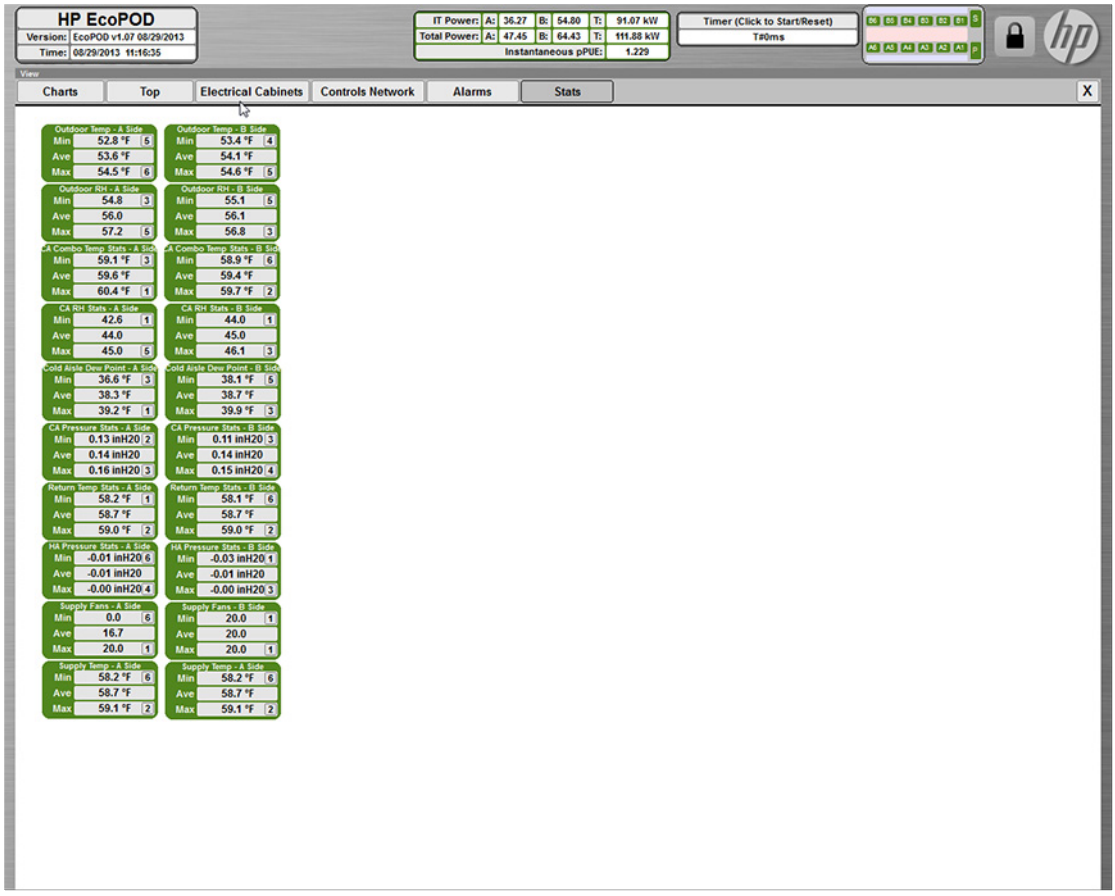
For a complete list of alarms, see the Modbus map in the Operations and Maintenance Manual for the HP POD 240e NA.


HP EcoPOD
Version: EcoPOD v1.07 08/29/2013
Time: 09/18/2013 14:17:18
IT Power: A: -0.23 B: -0.26 T: -0.50 kW
Total Power: A: 2.12 B: 0.96 T: 3.07 kW
Instantaneous pPUE: 0.000
Timer (Click to Start/Reset)
T#0ms
Charts
Top
Electrical Cabinets
Controls Network
Alarms
Stats
X
Latest 40 Alarms Since Last Reboot
2013-09-18-14:15:15.617, [AD B6] HA Static Pressure, rangeCritical = FALSE
2013-09-18-14:15:15.617, [AD B4] HA Static Pressure, rangeCritical = FALSE
2013-09-18-14:15:15.617, [AD B6] HA Static Pressure, rangeCritical = TRUE
2013-09-18-14:15:15.617, [AD B4] HA Static Pressure, rangeCritical = TRUE
2013-09-18-14:15:14.597, [AD B6] HA Static Pressure, rangeWarning = FALSE
2013-09-18-14:15:14.597, [AD B4] HA Static Pressure, rangeWarning = FALSE
2013-09-18-14:15:14.597, [AD B6] HA Static Pressure, rangeWarning = TRUE
2013-09-18-14:15:14.597, [AD B4] HA Static Pressure, rangeWarning = TRUE
2013-09-18-14:15:05.417, [AD B6] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD B4] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD B2] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD B1] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD A6] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD A5] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD A4] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD A3] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD A2] HA Return Temp, rangeCritical = FALSE
2013-09-18-14:15:05.417, [AD B6] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD B4] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD B2] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD B1] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD A6] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD A5] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD A4] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD A3] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD A2] HA Return Temp, rangeCritical = TRUE
2013-09-18-14:15:05.417, [AD B6] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD B4] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD B2] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD B1] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD A6] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD A5] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD A4] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD A3] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD A2] HA Return Temp, rangeWarning = FALSE
2013-09-18-14:15:05.417, [AD B6] HA Return Temp, rangeWarning = TRUE
2013-09-18-14:15:05.417, [AD B4] HA Return Temp, rangeWarning = TRUE
2013-09-18-14:15:05.417, [AD B2] HA Return Temp, rangeWarning = TRUE
2013-09-18-14:15:05.417, [AD B1] HA Return Temp, rangeWarning = TRUE
2013-09-18-14:15:05.417, [AD A6] HA Return Temp, rangeWarning = TRUE
Critical Alarms
[ECS] Hot Aisle Fan 1
[ECS] Hot Aisle Fan 2
[ECS] Hot Aisle Fan 3
[ECS] Hot Aisle Fan 4
[ECS] Hot Aisle Fan 5
[ECS] Hot Aisle Fan 6
[ECS] Hot Aisle Fan 7
[ECS] Hot Aisle Fan 8
[ECS] Hot Aisle Fan 9
[ECS] Hot Aisle Fan 10
Warning Alarms
[ECS] EPO Armed
[ECS] Primary UPS
[ECS] Pri. CA/HA Door
[ECS] Pri. ECS/Elec Door
[ECS] Scd. ECS/Elec Door

Stats screen

The Stats screen shows a list of minimum, maximum, and average sensor readings.

IMPORTANT: The ECS parameters must only be set by qualified service personnel.



The Stats screen allows you to set the following minimum and maximum setpoint alarm ranges for IT section A and IT section B.

Setpoint displayed	**Description**
Outdoor temperature	Indicates the outdoor temperature
Outdoor relative humidity	Indicates the outdoor relative humidity
CA combo temperature	Indicates the cold aisle combination temperature
CA relative humidity	Indicates the cold aisle relative humidity
Cold aisle dew point	Indicates the cold aisle dew point
CA pressure	Indicates the cold aisle pressure
Return temperature	Indicates the return temperature
HA pressure	Indicates the hot aisle pressure
Supply fans	Indicates the supply fan percentage
Min and Max value sensor number	Indicates the specific sensor that is reading the minimum and maximum value for each statistic

Offset alarms can be configured to alert the BMS when an AHU sensor is offset by the average or median from the remaining AHUs in the IT section. For more information, see "Setting the offset alarm (on page 57)."

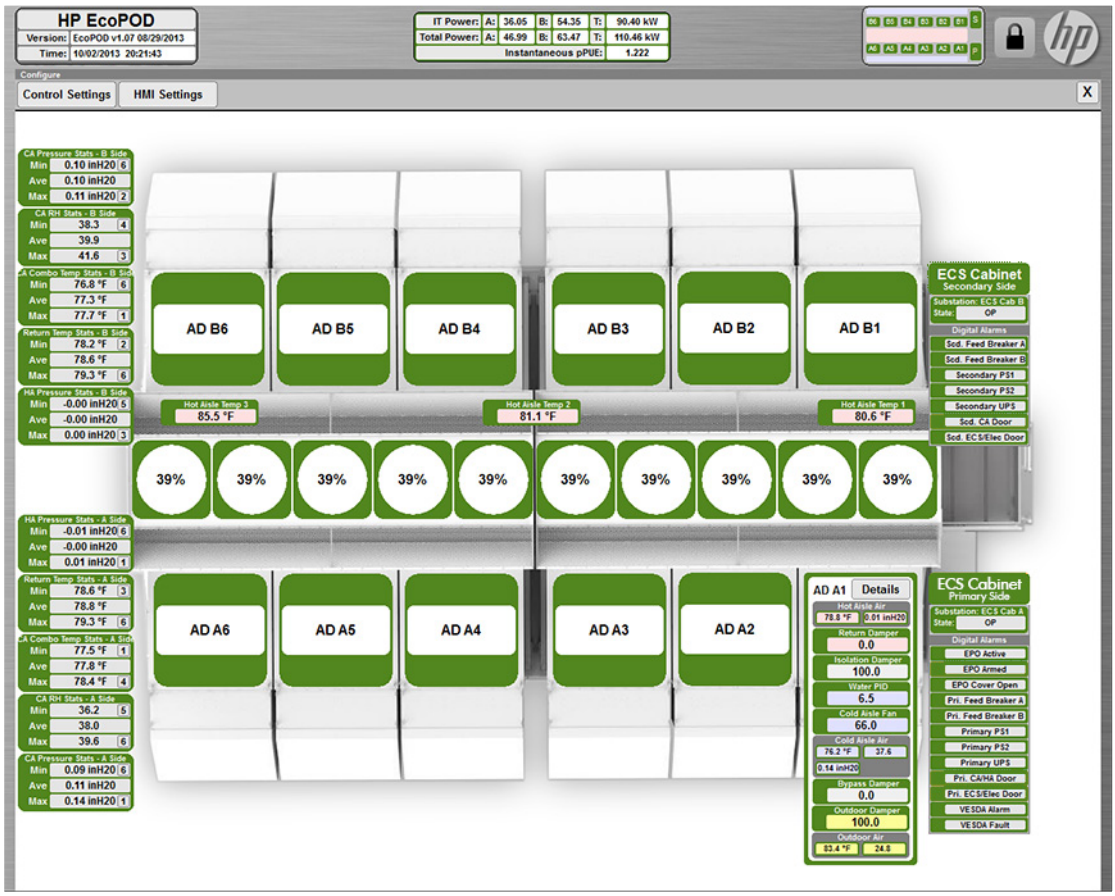
Configure

You can see the Configure menu when you enter the customer-level password. This menu allows you to configure alarm setpoints and Adiabatic control settings in the ECS system.

The following menus are available when you select the Configure menu:

- Control settings (on page 54)
- HMI settings (on page 55)

CAUTION: Making any change to the ECS in the customer-level area can cause the AHU to fail. Only authorized, qualified, and trained personnel should change configuration settings in the customer-level area of the ECS. Any changes to the configuration settings in the customer-level area might void your warranty.



Control settings

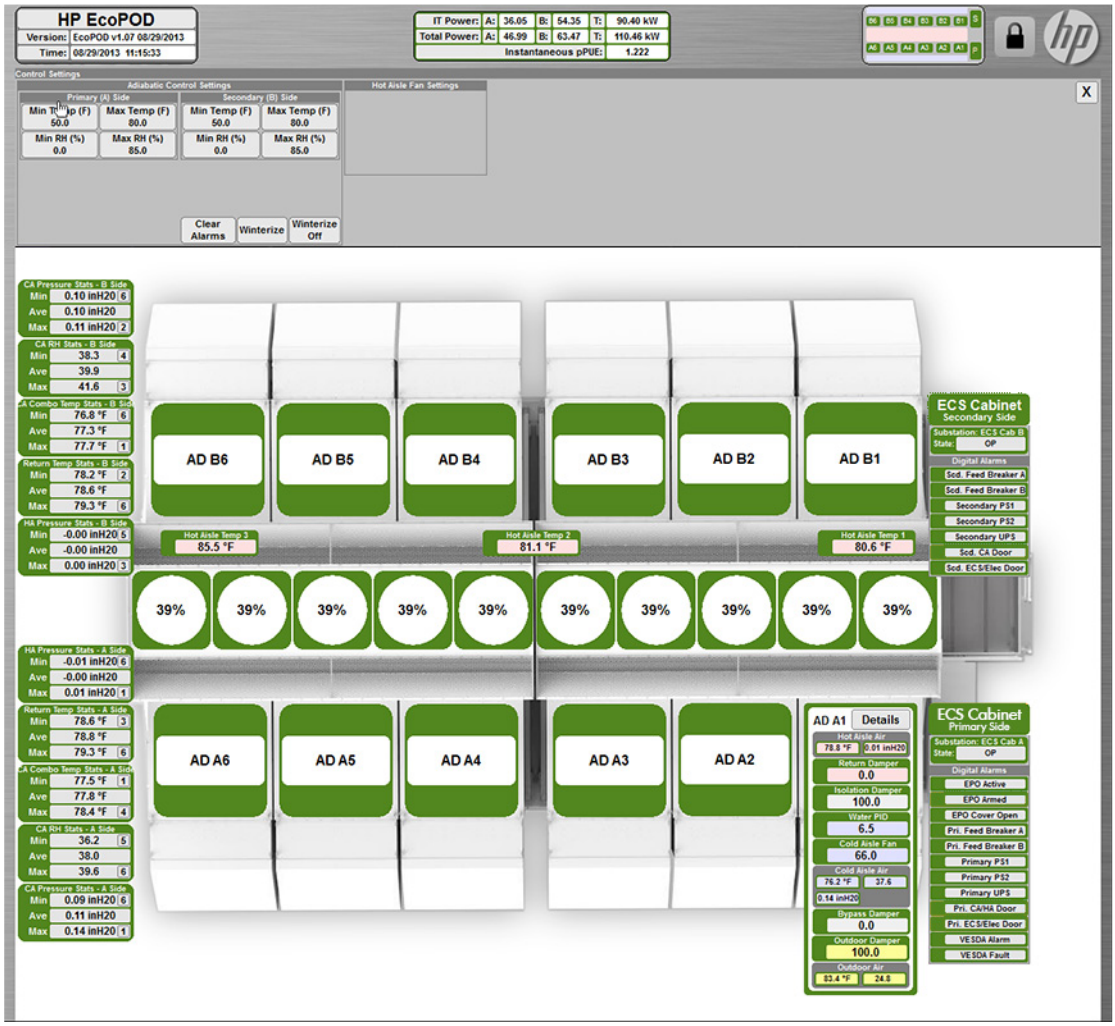
IMPORTANT: You can only access this menu after you enter a customer-level password.

IMPORTANT: The ECS parameters must only be set by qualified service personnel.

The Control Settings menu displays the Adiabatic Control Settings for IT section A and IT section B. The following settings can be configured from the Adiabatic Control Settings screen:

- Minimum and maximum temperature
- Minimum and maximum relative humidity
- Clear alarms
- Winterize

  For more information on how to winterize the HP POD 240e NA, see "Preparing the Adiabatic units for winter (on page 74)."



HMI settings

IMPORTANT: You can only access this menu after you enter a customer-level password.

The HMI Settings menu allows you to change unit types that display measurement throughout the ECS system.

To change the HMI settings:

1. Select **Configure** on the main toolbar.
2. Select **HMI Settings**.
3. Press the **Unit System** button to toggle to the unit of measurement that you want the ECS system to display. The choices are:

- US Customary
- Metric

Managing the ECS system

After you enter the customer-level password, you can manage various components within the HP POD 240e NA using the ECS. You can configure every component by using the same basic steps and concepts, described in this section.

Setting the Min and Max temperature and RH setpoints

You can configure the minimum and maximum temperature and relative humidity setpoints for each IT section.

> △ **CAUTION:** Making any change to the ECS in the customer-level area can cause the AHU to fail. Only authorized, qualified, and trained personnel should change configuration settings in the customer-level area of the ECS. Any changes to the configuration settings in the customer-level area might void your warranty.

To set the minimum and maximum temperature and relative humidity setpoints:

1. Select **Configure** on the main toolbar.
2. Select **Control Settings**.
3. Select the button for the setpoint you want to change in IT section A or IT section B (Min Temp, Max Temp, Min RH, Max RH).

   A keypad appears.
4. Enter the setpoint for the desired minimum or maximum configuration.
5. Select **Save** to store the new setpoint in the system configuration file.

Setting the Min and Max range for alarms

Each sensor that is connected to the ECS system can activate a warning and critical alarm. You can configure these alarms to alert you when the sensors fall out of a set range.

To set the range for alarms:

1. Select **Min** or **Max** on the alarm range you want to change.
2. Under the Range Warning and Critical heading:
   a. Toggle to **Enable TRUE**.

      Enable TRUE—The alarm range is active and alerts the ECS system.

      Enable FALSE—The alarm range is inactive and does not alert the ECS system.
   b. Click the **Low** button.

      A keypad appears.
   c. Set the Low point for the alarm range.

      The Low alarm range is the lowest minimum measurement that the sensor can read before an alarm becomes active in the ECS system.
   d. Click the **High** button.

A keypad appears.

e. Set the High point for the alarm range.

The High alarm range is the highest maximum measurement that the sensor can read before an alarm becomes active in the ECS system.

Setting the offset alarm

You can configure the offset alarm at a warning and a critical alarm level.

To set the offset alarm:

1. Click the sensor whose offset alarm you want to configure.

   You will see a sensor count that shows the minimum amount of sensors or AHUs that can be read before a warning or critical level alarm is triggered.
2. Toggle to **Enable TRUE**.

   Enable TRUE—The alarm is active and alerts the ECS system.

   Enable FALSE—The alarm is inactive and does not alert the ECS system.
3. Toggle to the alarm **Method**:

   Average—The sensor offset is based on the average value in the IT section.

   Median—The sensor offset is based on the median calculation of the IT section sensors.
4. Click the **Warn. Offset** button.

   A keypad appears.
5. Enter how far out of range the sensor readings will be before the ECS triggers a warning alarm.
6. Press **Enter**.
7. Click the **Crit. Offset** button.

   A keypad appears.
8. Enter how far out of range the sensor readings will be before the ECS triggers critical alarm.
9. Press **Enter.**

Setting the IP address

To set the static IP addresses:

1. Click the **IP** address.

   A keypad appears.
2. Enter the IP address.
3. Select **Save** to store the new parameters in the system configuration file.

Forcing an alarm

Forcing an ECS component gives you the ability to override ECS readings. Some examples of how to force a component include:

- Override an alarm
- Set fans on manual mode

- Create an alarm to test the system

To enable forcing for a component:

1. Click the component you want to force.
2. Toggle to **Forced TRUE**.

   TRUE—The alarm range is forced to an on/off state by user control.

   FALSE—The alarm range is automatically controlled by the system alarm setpoints.
3. Click the setpoint, alarm, or speed that you want to force.

   A keypad appears.
4. Enter the setpoint number you want to force on the component.

An **F** appears next to any component that is forced.

Maintaining the ECS parameters

For more information about how the HVAC system maintains the parameters set in the ECS, see the AHU theory of operation (on page 62).

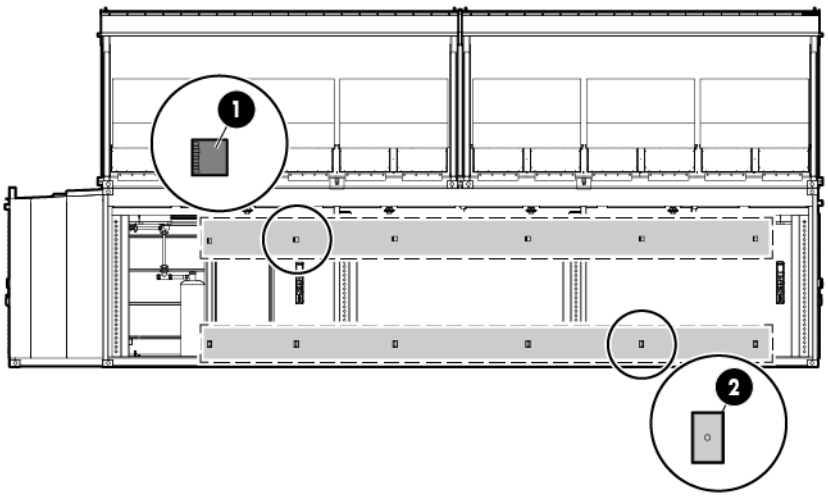
Temperature and pressure sensors

The HP POD 240e NA has several temperature and pressure sensors that monitor the environmental factors and then communicate back to the ECS.

- The values from the temperature sensors are calculated together to determine an average temperature for each aisle of the HP POD 240e NA.
- The pressure sensors in the IT sections measure the differential pressure between each sensor and the external ambient pressure.

IT section sensors

Side view shown

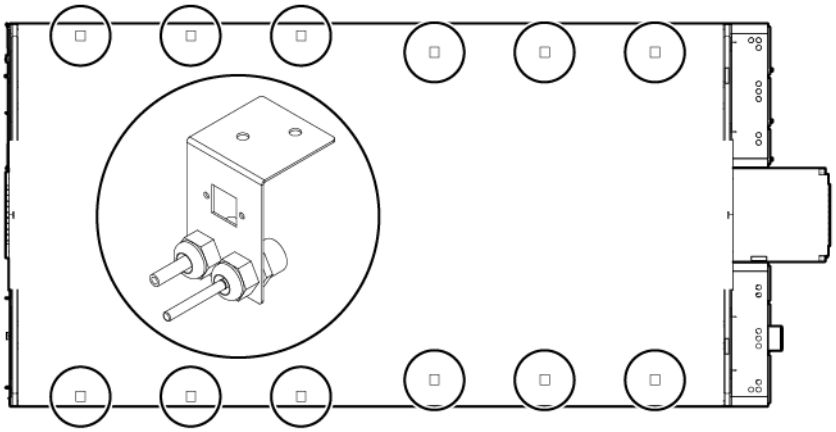


Callout	Sensor	Quantity per IT section	Description
1	Temperature and relative humidity sensors	6	• Monitor the temperature and humidity in the six Adiabatic zones of the HP POD 240e NA • Report data to the AHU controllers
2	Differential pressure sensor port	6	• Works in combination with the AHU sensors to monitor pressure in the six Adiabatic zones of the HP POD 240e NA • Reports data to the AHU controllers

HVAC sensors

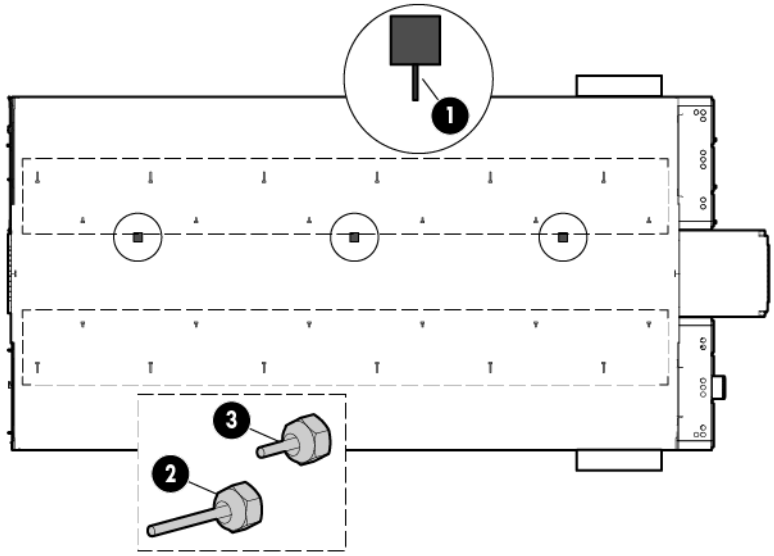
Six AHU temperature and pressure sensor probes work in combination with the differential pressure sensor port, callout (2) in the figure above, to calculate the cooling unit discharge temperature and average pressure in each IT section. This data is reported to the AHU controllers.

Top view shown



Hot aisle sensors

Top view shown



Callout	Sensor	Quantity per hot aisle	Description
1	Temperature sensors	3	• Monitor the temperature in various locations throughout the hot aisle of the HP POD 240e NA • Report data to the ECS
2	Hot aisle pressure sensor probes	12	• Monitor and report hot aisle pressure • Report data to the AHU controllers
3	Hot aisle temperature sensor probes	12	• Monitor and report hot aisle temperature • Report data to the AHU controllers

Outdoor air sensors

There is one sensor mounted on each Adiabatic unit that monitors the temperature and humidity of the outdoor air. Each sensor reports the data to the AHU controller.

Adiabatic units

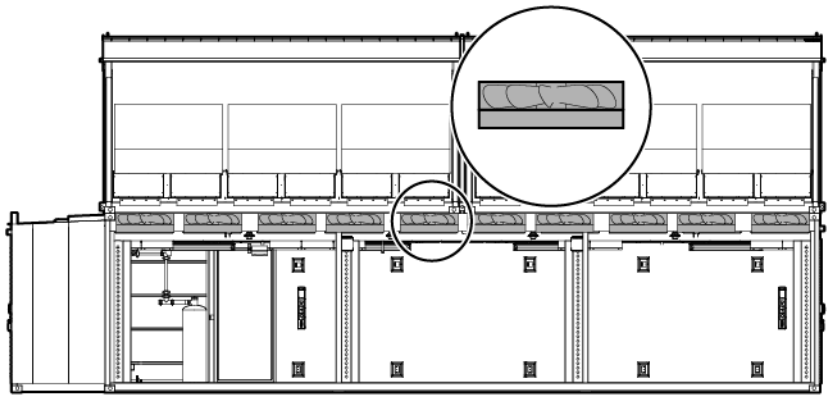
Each IT section of the HP POD 240e NA has six Adiabatic units that maintain the differential pressure and temperature parameters within the HP POD 240e NA.

For more information about the required power for the Adiabatic units, see "Power distribution: Adiabatic system (on page 28)."

Controlling the hot aisle fans

There are 10 exhaust fans located in the hot aisle of the HP POD 240e NA.

Side view shown



The HP POD 240e NA fans operate at variable speeds (0-100%) to maintain predetermined parameters programmed into the AHU. For more information about the fan mode, see "AHU theory of operation (on page 62)".

AHU system

Overview

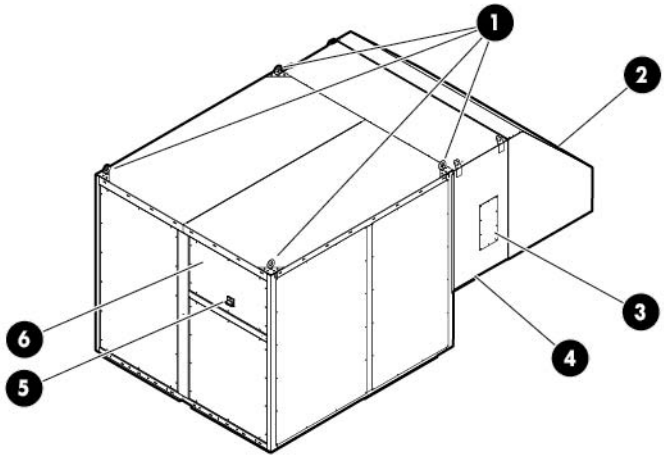
The POD AHU systems are designed to condition the air in a portable, containerized computer room, and are installed directly on top of the HP POD 240e NA. The HP POD 240e NA includes a total of four cradles, each holding 3 Adiabatic units, for a total of 12 Adiabatic units.

The AHU system requires a potable water source and HP highly recommends installing a filter to be sure that water is free of particles. For more information about water requirements, see the *HP Performance Optimized Datacenter 240e NA Site Preparation and Requirements Guide*.

Adiabatic components

Each Adiabatic unit is housed in a NEMA 3 rated steel frame cabinet that is rated for outdoor use. The exterior of the cabinet is coated with a durable finish to protect against corrosion. Access panels are located on the front and on the rear of the cabinet for easy access to all of the components. The access panels are safety interlocked with the power disconnect switch to prevent the removal of the panel when the switch is in the ON position. The power disconnect switch must be turned OFF to gain access to the electrical compartment.

Side view shown



Item	Component	Description
1	Lifting eyes*	For crane attachment to lift the Adiabatic unit during assembly
2	Inclement weather hood	Prevents snow or heavy rain from entering the Adiabatic unit. The inclement weather hood is also equipped with a screen to prevent birds and other small animals from nesting in the air inlet opening.
3	Access panel to the damper actuator	Provides access to the damper actuator motor

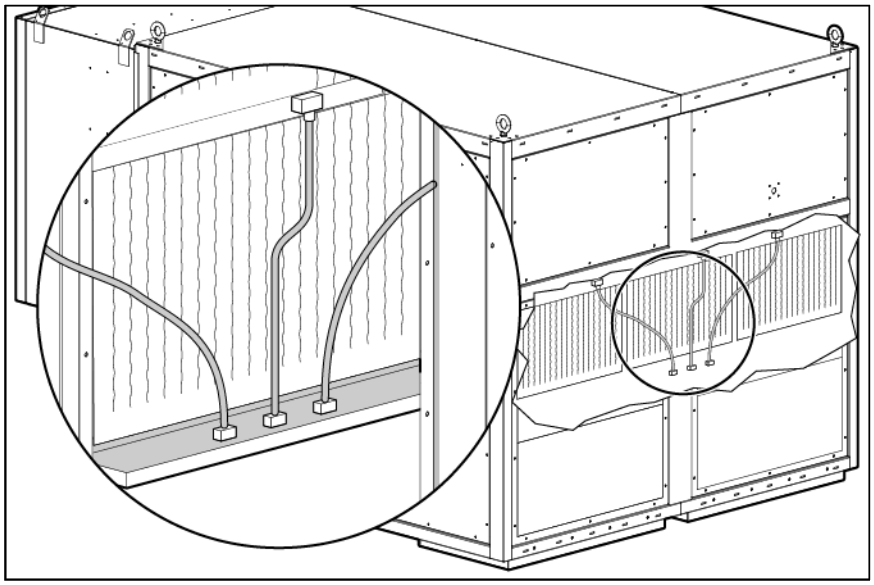
Item	Component	Description
4	Filter box	Louvers and dampers provide an outside air inlet of each Adiabatic unit. If the outside air temperature and humidity conditions are within the correct range of the operating envelope, the dampers open automatically when the AHU is powered on.
5	Power disconnect switch	The main power supply switch for each Adiabatic unit
6	Electrical controls box	Houses the electrical controls and components

* Use the lifting eyes on top of the unit to lift the Adiabatic unit. Do not lift the Adiabatic unit with the lifting eyes installed on the filter box.

Adiabatic media

Each Adiabatic unit contains three Adiabatic media, each with its own solenoid water supply valve. An outside source of water must be provided to saturate the media.

HP recommends potable water as the main water source for the media.



AHU theory of operation

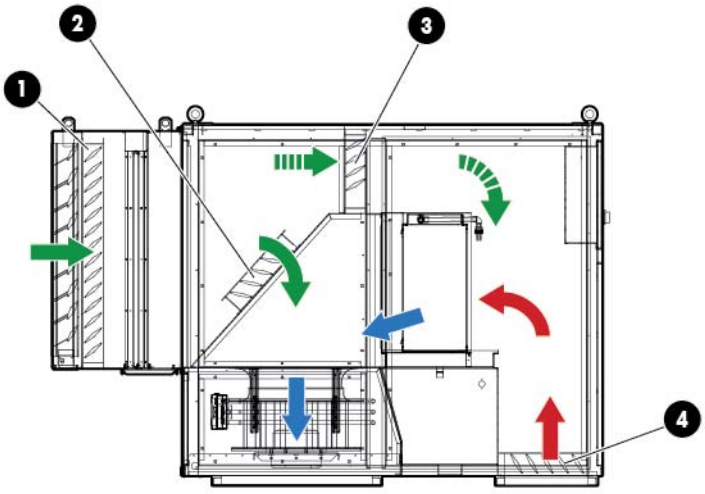
Damper operation

Each Adiabatic unit is equipped with louvered dampers that control the airflow through the unit. To control the environment inside of the HP POD 240e NA, the dampers work together to humidify dry outside air, as needed.

An external source of water must be provided to saturate the evaporative media. When the HP POD 240e NA begins operation, the supplied water is pumped through the pipes and out of the nozzles from the reservoir to the top of the evaporative media where it passes through spray nozzles onto the top of the evaporative media. The air that is pulled in through the media by the POD fans is now conditioned.

The controller sends an analog output signal to operate the outside air damper (1) by modulating it. Next, the bypass damper (2), the isolation damper (3), and the hot aisle return damper (4) are controlled to optimize the balance of outside air with humidified air in order to maintain the conditions in the IT section. The

isolation damper (3) is used to isolate the dry side of the Adiabatic unit from the wet side during cold weather operation.



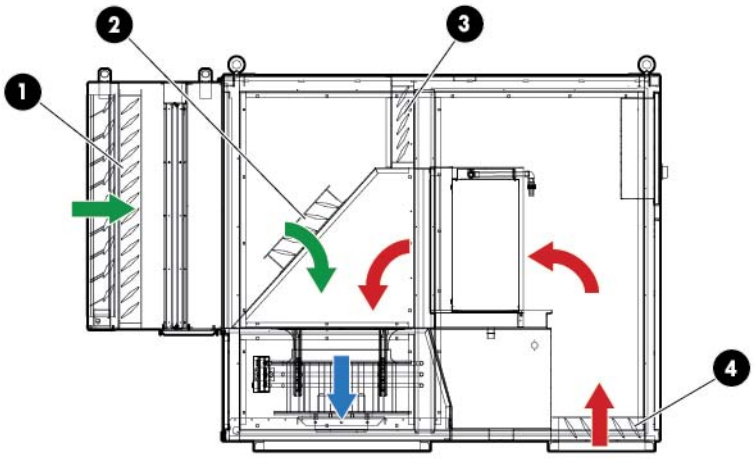
Below freezing damper operation

The isolation damper (3) is completely closed, so that sub freezing air cannot get to the wet media. The bypass damper (2) is completely open, enabling a path for the cold, dry air to enter the IT sections. The outside air damper (1) and hot aisle return damper (4) moderate to maintain a set temperature within the IT sections.

If the humidity within the HP POD 240e NA gets too low, water is added to the media to maintain the low RH humidity parameter, unless the ECS is set to Allow Low RH.

For more information on winterizing the HVAC/ Adiabatic units, see "Preparing the HVAC units for winter."

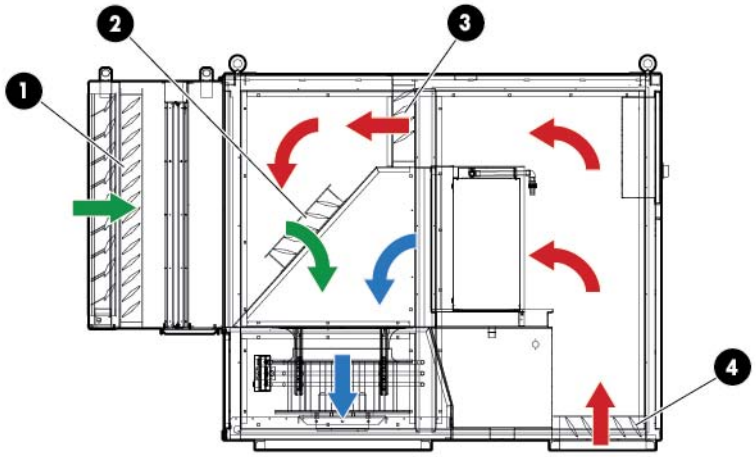
Side view shown



Economizer without additional cooling requirements

The bypass damper (2) and isolation damper (3) are both completely open, to optimize airflow efficiency. The outside air damper (1) and hot aisle return damper (4) moderate to maintain a set temperature within the IT sections.

Side view shown

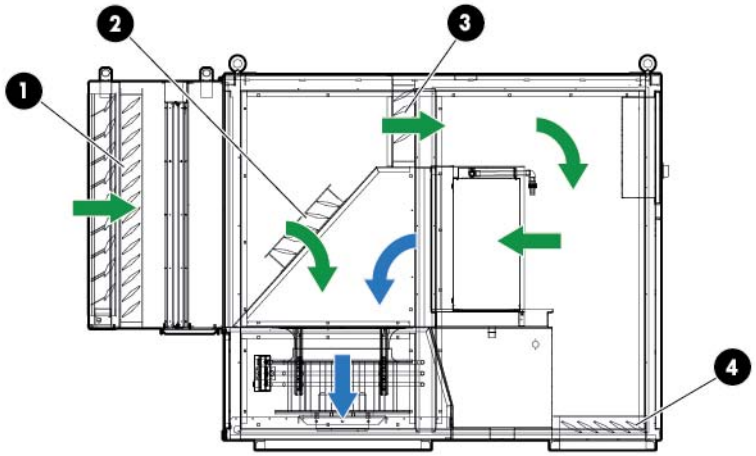


Hot weather damper operation

The hot aisle return damper (4) is completely closed, so that the air returning from the hot aisle is not recirculated through the Adiabatic unit. The outside air damper (1) and the isolation damper (3) are both completely open to optimize airflow efficiency. The bypass damper (2) modulates to maintain the humidity parameter.

Water is added to the media to cool the outdoor air, while still maintaining the humidity in the IT sections below the max RH parameter.

Side view shown



Exhaust fan operation

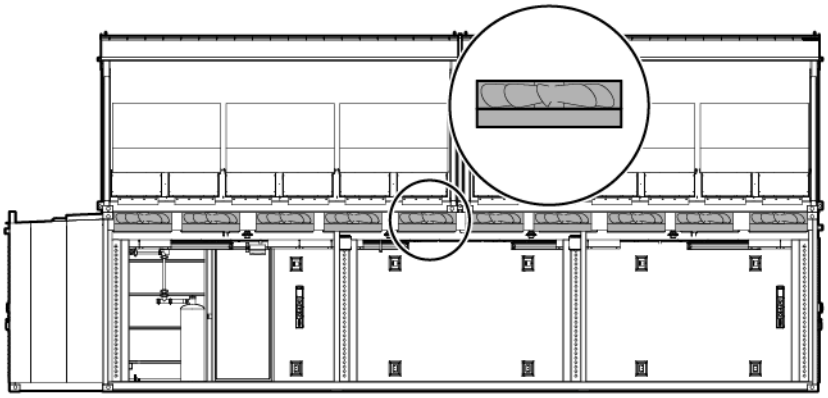
The HP POD 240e NA is equipped with 10 exhaust fans that remove heated air from the hot aisle. The exhaust fans feature an integrated monitoring function to protect the motor and electronics against damage from jamming, phase loss, or overheating.

If any of the following failure conditions occur, the motor automatically stops and an alarm is signaled:

- Locked rotor
- Low main supply voltage
- Loss of a phase
- Over-heating of the exhaust fan electronics
- Over-heating of the exhaust fan motor

For more information about the exhaust fan, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Side view shown



Static pressure control

The control of static pressure is used to be sure that the airflow from the cold aisle of the IT sections across the rack and into the hot aisle of the HP POD 240e NA remains constant. The pressure in the hot aisle is controlled to external ambient pressure, and the IT sections are slightly higher than the external ambient pressure.

The static pressure is controlled to a default parameter of 0.1 in H_2O above external ambient pressure in the cold aisle, which cannot be adjusted by a customer.

IT networking and communications

Networking

Connecting the HP POD 240e NA to the facility network is a vital part of confirming the functionality of the various communication systems. Due to the different customer equipment and networking setups, see the *HP Performance Optimized Datacenter 240e NA Networking Guide* for more information.

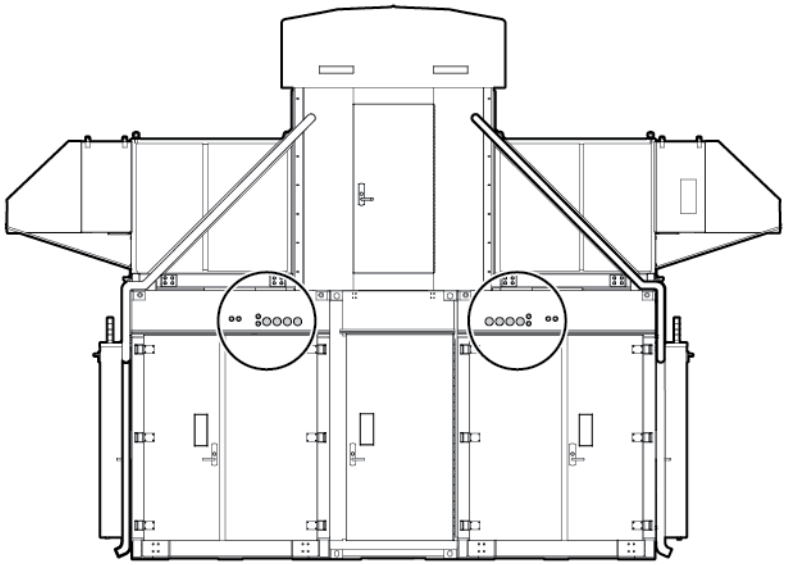
You are responsible for all connections. For configuration and installation instructions, consult with HP.

Connection portals

The networking and connection portals are located on both ends of the HP POD 240e NA.

Each IT section has eight portals located on the cargo-end of the POD, and each of the differently sized portals are used for different connections.

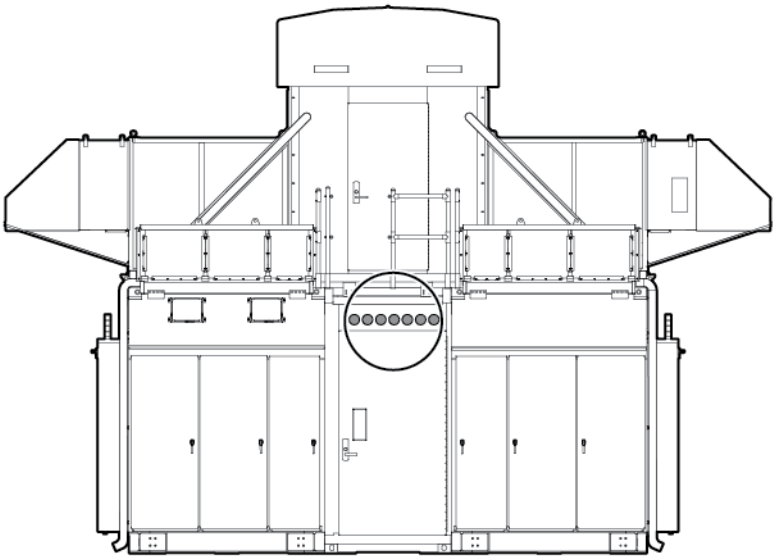
End view shown



Connection portal diameter	Connection point	Quantity per IT section	Total quantity per HP POD 240e NA
7.62 cm (3 inch)	Networking connection for all IT	4	8
3.81 cm (1.5 inch)	Communication connection for: • ECS • EPO • Fire alarm • Phone	2	4
3.81 cm (1.5 inch)	(Optional) vestibule communication connections	2	4

On the front-end of the POD, there are seven 7.62 cm (3 inch) portals that you can use for data connections.

End view shown



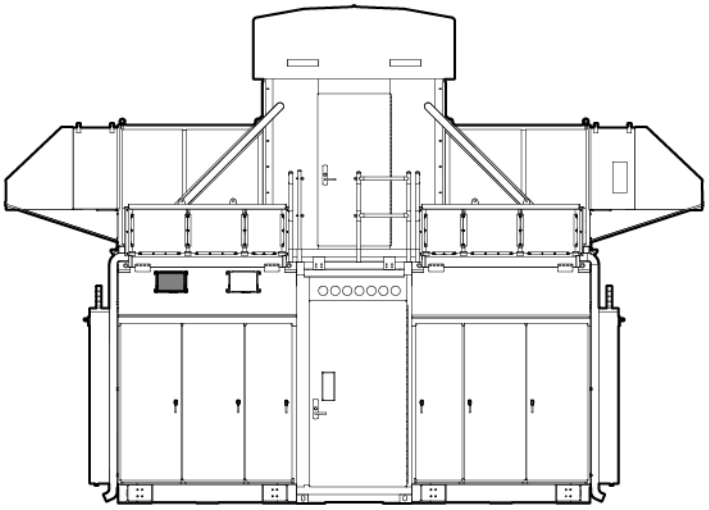
IMPORTANT: The connection portal location and configuration might look different, depending on the HP POD 240e NA model.

Demarcation box

The following communication connections between your facility and the HP POD 240e NA are made through the demarcation box:

- ECS communication
- Access control communication
- Phone

End view shown

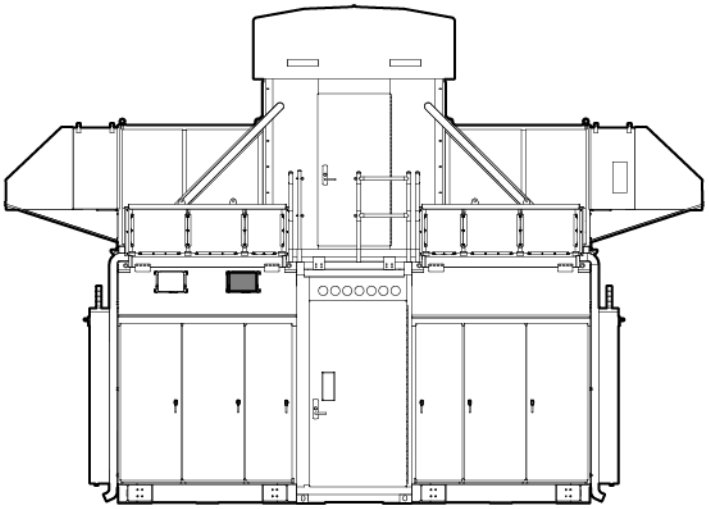


You must make the connections between the facility and the HP POD 240e NA. For configuration and installation instructions, consult with HP.

Fire box

The communication connections between the site fire system and the HP POD 240e NA are made through the fire box.

Front view shown

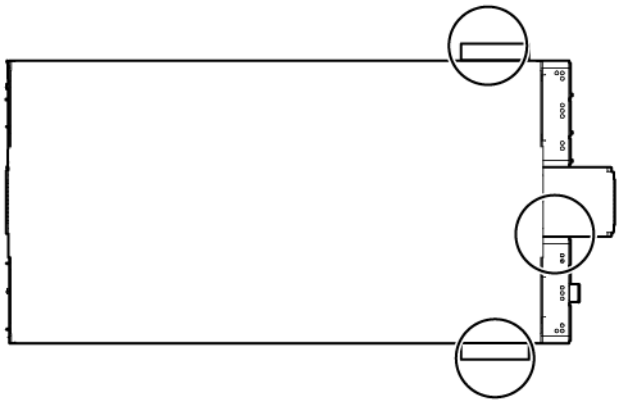


You must make the connections between the facility and the HP POD 240e NA. For configuration and installation instructions, consult with HP.

Adding a phone

The HP POD 240e NA has a junction box location in each section that you can wire to install a telephone. There are a total of three junction box locations throughout the HP POD 240e NA.

Top view shown



You must provide and install the phones, including pulling cables to the appropriate junction box. For configuration and installation instructions, consult with HP.

Standard components

Air filter sensor

There is an air filter sensor in each Adiabatic unit that sends an alert for any change in the air filter status. If an air filters needs replacement, the sensor sends an alert to the ECS and identifies the exact Adiabatic unit affected. Each Adiabatic unit has four air filters, all of which must be replaced after an alarm triggers.

△ **CAUTION:** Replace air filters upon notification from the ECS to maintain optimal air flow. For replacement instructions and information about the air filter media pack, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Optional components

HP POD 240e NA optional components

There are several optional components available for the HP POD 240e NA, including but not limited to:

- Controlled access
- Power feeder pull boxes

For more information about optional components, see the Operations and Maintenance Manual for the HP Performance Optimized Datacenter 240e North America (Adiabatic).

Power feeder pull boxes

The HP POD 240e NA requires power feeder pull boxes for the electrical cabinets to prevent water from getting into the POD through the connection portals. The pull boxes can be customized to the facility and configuration of the power feeders.

For more information about the power feeder pull boxes, see the Operations and Maintenance Manual for the HP Performance Optimized Datacenter 240e North America (Adiabatic).

Specifications

General specifications

Features	Specifications
Overall dimensions	• Height—6.74 m (22 ft 1 1/4 inches) • Length—13.77 m (45 ft 2 1/4 inches) including hot aisle porch • Width—9.53 m (31 ft 3 inches) with cradles and hoods installed
Weight[1]	Empty—66,859 kg (147,400 lb) Full—138,309 kg (304,920 lb)
Power input voltage	• IT equipment—415/240V, 3-phase, wye, 4 wire • Adiabatic system—415/240V wye
Power distribution	200A electrical busways[2]
Maximum rack quantity	44 racks
RUs per rack	50 RU
RU total	2,200 RU
Peak rack capacity	69.12 kW
Voltage to rack	240V
Minimum quantity of PDUs per HP POD 240e NA	44 (one per rack)
Maximum quantity of PDUs per HP POD 240e NA	88 (two per rack)
Maximum power per PDU	34.56 kW
Network supported	Bulk cable pass through fiber Bulk cable pass through copper (Optional) External-rated demarcation box

[1]Empty weight includes the HP POD 240e NA structure, empty racks, PDUs, and drop boxes. It does not include any IT equipment. All weights are estimates and can vary for your POD.
[2]Can be configured for redundancy or non-redundancy

Rack specifications

Standard HP POD 240e NA racks (AT978A)

Feature	Specification
U height	50U
Width	54.6 cm (21.5 in)
Depth	87.6 cm (34.5 in)
Maximum load weight	1,360.7 kg (3,000 lb)

Environmental specifications

Feature	Specification
Operating temperature	-28°C to 54°C (-20°F to 130°F)
Non-operating temperature*	-29°C to 54°C (-20°F to 130°F)
Operating humidity	0% to 100% relative non-condensing
Non-operating humidity*	• 5 to 95% relative non-condensing • 39°C (102°F) maximum wet bulb temperature
Operating altitude	-76.2 to 3,048 m (-250 to 10,000 ft)
Non-operating altitude	-76.2 to 9,144 m (-250 to 30,000 ft)

*For non-operating specifications, consider the temperature of computer and IT equipment inside the HP POD 240e NA.

Maintenance

Periodic maintenance

Perform periodic inspections to ensure that the HP POD 240e NA continues to perform according to design parameters. During periodic inspections, pay special attention to electrical connections and wiring.

You are responsible for creating and performing detailed preventative maintenance based on HP recommendations. Data sheets or additional operation and maintenance manuals will be provided for this task.

CAUTION: Failure to implement a comprehensive preventative maintenance schedule may result in reduced efficiency in the HP POD 240e NA, failure of main or subsidiary systems, and loss of warranty on third party components.

For more specific maintenance information, see the *HP Performance Optimized Datacenter 240e NA Maintenance and Service Guide*.

Preparing the Adiabatic units for winter

CAUTION: Because the Adiabatic units use water, you must take extra precautions during the winter months to establish safe operating conditions of the HP POD 240e NA.

IMPORTANT: HP recommends contacting your HP representative prior to winterizing your HP POD 240e NA for further instructions.

There are three major processes that you must complete to winterize the HP POD 240e NA Adiabatic units.

Complete the following processes in the following order:

1. Supply header gravity drain (on page 76)
2. Adiabatic unit by unit blowdown (on page 77)
3. Supply header blowdown (on page 78)

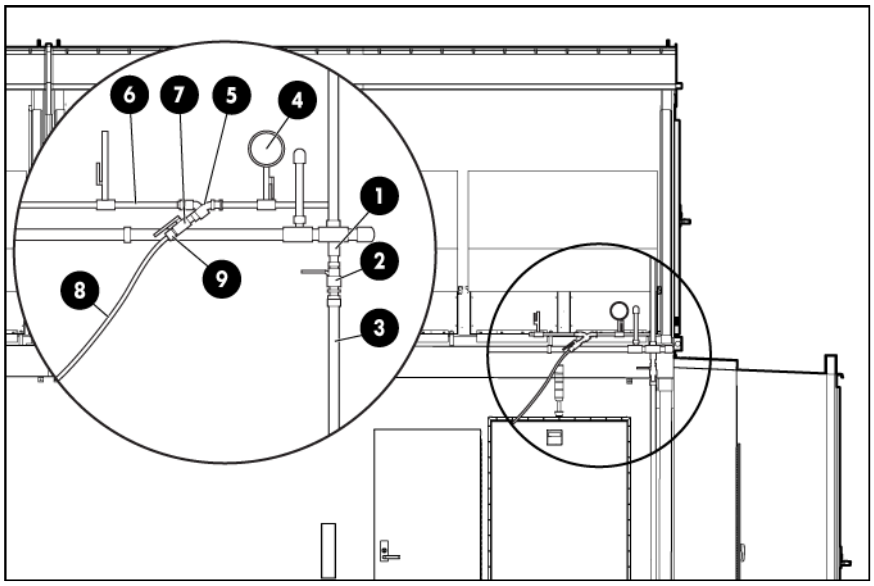
Your site or POD might have different component locations or a different number of Adiabatic units.

You will need the following items to winterize the Adiabatic units:

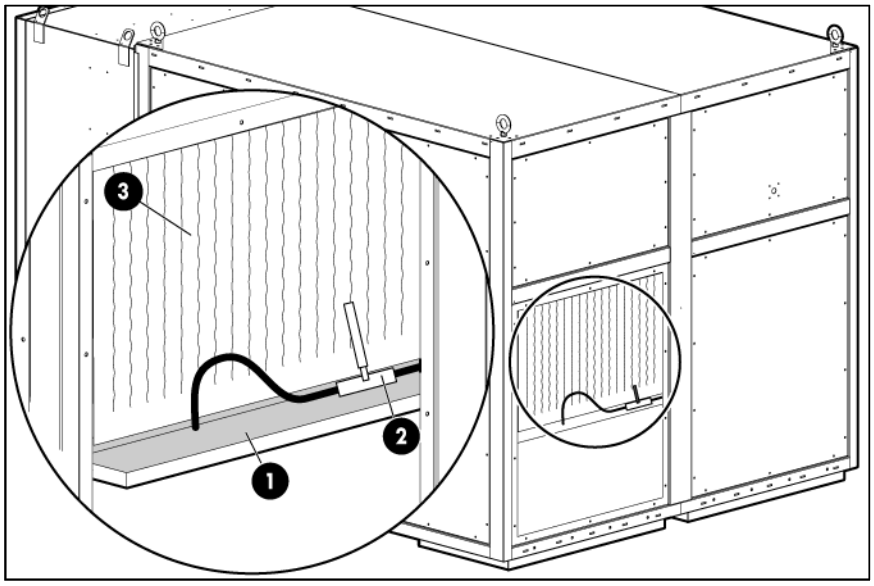
- Air hose adapter—Connects the house air or compressor to the supply header.
- Adiabatic unit splash deflector—Used inside of each Adiabatic unit to prevent unnecessary splashing.

  This splash deflector consists of a hose barb adapter and enough flexible tubing to direct water to the drain.

- Garden hose and fitting—Connects to the supply header drain.



Item	Component	Description
1	Drain line	Allows for drainage from the cooling media supply water
2	Drain valve	Isolation valve for the drain line
3	Drain hose	Customer-supplied hose connector
4	Blowdown pressure gauge	Optional gauge that can be added to the supply header
5	Y-strainer	Allows for suspended solids to be removed from the supply valve water
6	Supply header	Cooling media supply water
7	Y-strainer clean-out valve	Allows for a blowdown of the y-strainer
8	Air hose	Customer-supplied from an air compressor or site air supply
9	Air hose connector	Customer-supplied to connect a valve to an air hose



Item	Component	Description
1	Drain pan	Collects excess media water from the Adiabatic unit

Item	Component	Description
2	Adiabatic media nozzle drain	Isolation valve for the drain valve
3	Adiabatic media	Used for AHU cooling

Supply header gravity drain

The AHU solenoids are actuated to provide back pressure relief and allow the system to drain. In order to drain the system from the high point located at the Adiabatic media spray bar down to the low point of the supply drain, complete the following steps:

1. Close all of the site AHU supply header isolation valves to the HP POD 240e NA.
2. Remove the installed plug from the supply header drain line and attach the water hose from the drain line to a site drain, if possible.
3. Place the ECS system of the HP POD 240e NA in Winterization mode:
   a. On the ECS panel in IT section A, select the lock icon and type `'hpinvent'`.
   b. Press the **Enter** button.
   c. Select the configure button from the Top View or AD detail screens.
   d. Select the **Winterize** button.
   e. The media spray solenoid valves of the Adiabatic units open.
4. If the supply system contains a relief or vent valve, open or pin the valve open to maximize drain capabilities.
5. Open the supply header isolation ball valve by rotating the handle 90° counter-clockwise to align the handle parallel to the ball valve.

   The Adiabatic supply header is now draining.
6. When water stops flowing from the supply header, close the drain line ball valve by rotating the handle 90° clockwise to align the handle perpendicular to the ball valve.
7. If the time limit on ECS system Winterization mode has not elapsed, manually turn off the Winterization mode to close the media spray solenoid valves:
   a. On the ECS panel in IT section A, select the lock icon and type `'hpinvent'`.
   b. Press the **Enter** button.
   c. Select the configure button from the Top View or AD detail screens.
   d. Select the **Winterize off** button.
   e. The media spray solenoid valves of the Adiabatic units close.
8. Close the relief or vent valve that was opened during step 4, if applicable.

IMPORTANT: Both Aisle A and Aisle B of the Adiabatic units must be drained to complete the Winterization process of the HP POD 240e NA.

Continue preparing the Adiabatic units for winter by completing the Adiabatic unit by unit blowdown (on page 77).

Adiabatic unit by unit blowdown

Before you begin the process below, be sure to complete the steps in "Supply header gravity drain (on page 76)."

These steps allow low pressure air to force water from the AHU supply header through an additional drain that is located inside the access panel of each Adiabatic unit.

1. Remove the plug from the supply header debris Y-strainer.
2. Open the flushing ball valve by rotating the handle 90° until it is aligned parallel to the strainer and allow the Y-strainer to drain.
3. Connect the air hose from the site or from a portable compressor to the open Y-strainer connection using an air hose adapter.
4. Connect the air hose to the air source.

   If you use a compressor, start the compressor and then open the air isolation valve from the chosen source.

   △ **CAUTION:** Maximum allowable air pressure in the Adiabatic water supply header is 50 psi. Do not exceed this pressure at any time.

5. Move to the AHU service area of the POD.
6. Shut down power to the Adiabatic unit that is farthest from the air source by rotating its power switch to the **Off** position.

   IMPORTANT: Only blow down one Adiabatic unit per aisle at a single time. Failure to do this will disrupt optimal air flow in the POD.

7. Open or remove the media access cover to the left of the Adiabatic unit control panel that was just turned off to show the inside of the unit.
8. Locate the spray nozzle header assembly drain line.
9. Attach the splash deflector finger-tight. Position the tubing so that blow down water is deflected into the drain pan, which minimizes splashing.
10. Carefully open the spray nozzle header drain valve. Be sure to apply air pressure to the spray header and observe that the splash deflector is in place.
11. Close the drain valve when either water stops flowing or air pressure is depleted.
12. Repeat steps to open and close the drain valve until no water exits through the drain valve.
13. Close the nozzle header drain valve.
14. Locate and close the external Adiabatic unit spray nozzle header isolation ball valve to isolate the unit from site water.

    IMPORTANT: The external spray nozzle header may still be pressurized. This air pressure must be relieved.

15. Open the spray nozzle header drain valve to allow the header to de-pressurize.
16. Close the spray nozzle header drain valve.
17. Remove the splash deflector and replace or close the media access cover.
18. Repeat steps to open and close the drain nozzle to complete blowing down the Adiabatic units on this aisle.

Continue preparing the Adiabatic units for winter by completing the instructions in "Supply header blowdown (on page 78)."

Supply header blowdown

Before you begin the process below, be sure to complete the steps in the following sections:

1. Supply header gravity drain (on page 76)
2. Adiabatic unit by unit blowdown (on page 77)

Be sure that all Adiabatic units are isolated from the supply header. If all Adiabatic units are not isolated from the supply header, see "Adiabatic unit by unit blowdown (on page 77)." To be sure the maximum amount of water is removed from the entire supply header(s), complete the following steps:

IMPORTANT: Be sure air pressure is available to complete the next steps.

1. Pressurize the supply header to 20-50 psi with a pressure gauge, if installed, and close the Y-strainer flushing valve.
2. Open the supply header drain valve to release the air pressure and water.
3. Close the supply header drain valve when the header pressure is zero.
4. Repeat the steps to open and close the drain valve for five cycles, or until no water remains.

   At this point, all headers are at atmospheric pressure, all water is removed from the system, and all power is removed at each Adiabatic unit.
5. Remove the garden hose and air adapter assemblies, and then replace the previously removed plugs.

Power up procedure

Standard power up procedure

This procedure is for reference only and assumes that the POD is fully commissioned and powered up by HP before being turned over to you.

Before you begin the power up procedures in this section, verify that the POD is not in operation and that the internal ambient temperature of the POD is greater than 10°C (50°F). If the internal ambient temperature of the POD is less than 10°C (50°F), see "Cold weather power up procedure (on page 80)."

This process helps to be sure that personnel are safe during the electrical power up of the HP POD 240e NA.

WARNING: To avoid risk of personal injury or loss of life, do not open an energized POD electrical cabinet without an energized work permit and appropriate PPE.

Power up checklist

Site electrical

- Verify that all site POD critical IT feeder supply breakers are open.
- Verify that all site Adiabatic mechanical feeder supply breakers are open.

POD electrical

- Service aisle—Verify that all site Adiabatic unit service disconnects are open.
- Hot aisle—Verify that all IT power drop box breakers on the power tap boxes are open.

IMPORTANT: Following these steps prevent any possibility of energizing the IT load.

- IT sections A and B:
  a. Close all non-spare breakers and fuses within the control cabinet.
  b. Close and latch the control cabinet.
  c. Position the EPO system (on page 19) to Armed (white) or Bypass (green).
  d. Verify that all EPO activation buttons are in the reset position (not depressed).
- IT critical power feed cabinets A and B:
  a. Close all non-spare breakers within primary A and B and secondary A and B power supply cabinets.
  b. Close and lock electrical cabinet doors.
  c. Close all Adiabatic power supply feeder breakers in both the primary mechanical and secondary mechanical cabinets.
  d. Close and lock Adiabatic primary mechanical and secondary mechanical cabinets.

Standard power up procedure

Perform the following procedures in the exact order in which they are listed.

Electrical

Site electrical

1. Close all site POD critical IT power feeder supply breakers and monitor them for any effects that are not standard.
2. Close all site Adiabatic mechanical feeder supply breakers and monitor them for any effects that are not standard.

POD electrical

Close all of the site Adiabatic unit service disconnects in the service aisle.

ECS and EPO

Verify the following on using the ECS touchscreen and EPO indicators:

- The ECS panel is operational and displays the user interface.
- The POD lighting is operational.
- The EPO system is set to Armed (White) or Bypass (Green).

Standard operation

1. On the ECS touchscreen, verify that all system components are operational (green) and no alarm conditions exist.
2. On the ECS touchscreen, verify the operating envelope is accurate.
3. Wait five minutes to allow the system to stabilize.
4. In the hot aisle, close the power drop box breakers for each rack and be sure that the IT equipment is operating.
5. Wait five minutes to allow the system to stabilize.

The HP POD 240e NA is now fully operational and the control system monitors for proper environmental control operation.

Cold weather power up procedure

This procedure is for your reference only and is written with the assumption that HP fully commissioned and powered up the POD before turning it over to you.

Before you begin the power up procedures in this section, verify that the POD is not in operation and that the internal ambient temperature of the POD is less than 10°C (50°F). If the internal ambient temperature of the POD is greater than 10°C (50°F), see "Standard power up procedure (on page 79)."

IMPORTANT: The minimum acceptable inlet temperature for IT equipment is 10°C (50°F).

Following this process helps to be sure that personnel are safe during the electrical power up of the HP POD 240e NA.

WARNING: To avoid risk of personal injury or loss of life, do not open an energized POD electrical cabinet without an energized work permit and appropriate PPE.

This procedure requires a method of warm air generation in sufficient quantities to increase the internal temperature of the POD and maintain a temperature of 12°C (53°F) for a minimum of 6 to 12 hours. The

method to supply warm air is your responsibility. HP will advise on warm air alternatives; however, all references to warm air production are your responsibility during this procedure.

Cold weather power up checklist

Site electrical

- Verify that all site POD critical IT feeder supply breakers are open.
- Verify that all site Adiabatic mechanical feeder supply breakers are open.

POD electrical

- Service aisle—Verify that all site Adiabatic unit service disconnects are open.
- Hot aisle—Verify that all IT power drop box breakers on the power tap boxes are open.

IMPORTANT: Following these steps prevent any possibility of energizing the IT load.

- IT sections A and B:
  a. Close all non-spare breakers and fuses within the control cabinet.
  b. Close and latch the control cabinet.
  c. Position the EPO system (on page 19) to Armed (white) or Bypass (green).
  d. Verify that all EPO activation buttons are in the reset position (not depressed).
- IT critical power feed cabinets A and B:
  a. Close all non-spare breakers within primary A and B and secondary A and B power supply cabinets.
  b. Close and lock electrical cabinet doors.
  c. Close all Adiabatic power supply feeder breakers in both the primary mechanical and secondary mechanical cabinets.
  d. Close and lock Adiabatic primary mechanical and secondary mechanical cabinets.

Standard power up procedure

Perform the following procedures in the exact order in which they are listed.

Electrical

Site electrical

1. Close all site POD critical IT power feeder supply breakers and monitor them for any effects that are not standard.
2. Close all site Adiabatic mechanical feeder supply breakers and monitor them for any effects that are not standard.

POD electrical

Close all of the site Adiabatic unit service disconnects in the service aisle.

ECS and EPO

Verify the following using the ECS touchscreen and EPO indicators:

- The ECS panel is operational and displays the user interface.
- POD lighting is operational.
- The EPO system is set to Armed (White) or Bypass (Green).

Cold weather operation

1. On the ECS touchscreen, determine internal and external ambient temperatures.
2. On the ECS touchscreen, verify that all system components are operational (Green) and no alarm conditions exist.
3. On the ECS touchscreen, determine the internal POD temperature.
4. Begin warm air generation in the hot aisle.
5. On the ECS touchscreen, monitor the POD internal temperature and continue warm air generation until all internal indicators show the internal temperature is 12°C (53°F).
6. Maintain POD internal temperature above 12°C (53°F) for a minimum of 6 to 12 hours before you proceed to the next step.
7. Stop warm air generation in the hot aisle.
8. On the ECS touchscreen, select and write the appropriate operating mode to the Adiabatic units.
9. In the hot aisle, close the power drop box breakers for each rack and be sure that the IT equipment is operating.
10. On the ECS touchscreen, monitor POD operation.

    Continue to monitor POD operation for the next hour to verify that it stabilizes.

The HP POD 240e NA is now fully operational and the control system monitors for proper environmental control operation.

Power down procedure

Full power down procedure

This procedure completely powers down the HP POD 240e NA and is intended for personnel safety during the full power down of the POD.

⚠ **WARNING:** To avoid risk of personal injury or loss of life, POD electrical cabinets should be closed at all times.

To power down the HP POD 240e NA:

1. Power down all IT equipment in IT sections A and B.
2. Open all POD power drop box breakers in the hot aisle.
3. Open all Adiabatic unit service disconnects in the service aisle.
4. Open the site critical IT feeder supply breakers.
5. Open the site Adiabatic feeder supply breakers.

The HP POD 240e NA is now fully powered down.

Contacting HP

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log (HP ProLiant Gen8 or later products)

  Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/ilo/docs).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)

  For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (http://www.hp.com/go/OAlog).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Regulatory compliance notices

HP POD 240e NA regulatory compliance

The HP POD 240e NA complies with the following regulatory standards.

Standard	Certification level	Standard title
UL 60950	ETL "Listed"	• UL 60950—*Standard for Safety Information Technology Equipment, Part 1: General Requirements*, Issue: 2007/03/27, Edition: 2 • UL 60950—*Standard for Safety Information Technology Equipment, Part 22: Equipment to be Installed Outdoors*, Issue: 2007/04/23, Edition: 1
NFPA 70	ETL "Classified"	NFPA 70—*National Electric Code, 2008 Edition*, © 2008 National Fire Protection Association
NFPA 72	Designed to Comply With	*National Fire Alarm code, 2007 Edition*, © 2006 National Fire Protection Association
NFPA 2001	Designed to Comply With	*NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems, 2008 Edition*, © 2008 National Fire Protection Association
IBC 2009	Designed to Comply With	*2009 International Building Code*, © 2010 International Code Council, Inc.

Safety and NEC compliance

The HP POD 240e NA is Listed to UL 69050 Part 1 and Part 22 as an Information Technology Product and Classified in accordance with the National Electric Code NFPA 70.

The HP POD 240e NA is not habitable or suitable for human occupancy. The HP POD 240e NA is Listed as a Product that provides Service Access Areas for periodic maintenance and service. Access to these areas must be controlled and available for use only by owner-authorized and qualified personnel who are trained in the maintenance and service of the HP POD 240e NA components. For more information, see "HP POD 240e NA regulatory compliance (on page 85)."

IMPORTANT: Before installing the HP POD 240e NA, consult your local AHJ for applicable regulations and to review site-specific location guidelines. If needed, obtain any necessary permits.

Additional considerations for safety and NEC compliance are as follows:

- The HP POD 240e NA is Listed as an Information Technology Equipment Product to UL 60950.
- The HP POD 240e NA is evaluated as a "non-inhabitable product" that provides "service access" areas for customer-authorized, qualified, and trained service personnel.
- The electrical connections of the HP POD 240e NA are evaluated as feeder connections for connection to an existing facility. The electrical connections are not suitable as "service entrance" for connection to the utility.

- The HP POD 240e NA is designed for stationary installation outdoors in a Pollution Degree 3 environment, in restricted access locations, and with field wiring terminals provided for permanent supply connections.
- The HP POD 240e NA meets the ratings in the following table.

Feature	Specification
Category	Rated Overvoltage Category III
Protection	Surge protection device
Class	Class1
Ambient temperature	2°C to 54°C (35.6°F to 129.2°F)
Relative humidity	0% to 100% humidity
Enclosure	NEMA 3R

- As part of the overall certification, relevant sections of the International Building Code have been applied as part of the design and evaluation. The current design supports wind loads up to 90 mph.

Safety and regulatory compliance

For safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the HP website (http://www.hp.com/support/Safety-Compliance-EnterpriseProducts).

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057

Warranty information

HP ProLiant and X86 Servers and Options (http://www.hp.com/support/ProLiantServers-Warranties)

HP Enterprise Servers (http://www.hp.com/support/EnterpriseServers-Warranties)

HP Storage Products (http://www.hp.com/support/Storage-Warranties)

HP Networking Products (http://www.hp.com/support/Networking-Warranties)

Glossary

AD

Adiabatic

AHJ

authority having jurisdiction

AHU

air handler unit

BMS

building management system

CA

cold aisle

cover

An unhinged portion of an enclosure that covers an opening.

CSC

container safety convention

disconnect switch

A device that disconnects all ungrounded conductors of a circuit from their electrical supply.

door

A hinged portion of an enclosure that covers an opening.

ECS

environmental control system

EPO

emergency power off

equipment

A general term, including fittings, devices, appliances, luminaries, apparatus, machinery, and the like used as a part of, or in connection with, a modular data center (Source: NEC).

HA

hot aisle

labeled

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

listed

Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards potential of not more than 42.4 V (DC or peak) supplied by a primary battery or by an isolated secondary circuit, and where the current capacity is limited by an overcurrent device, such as a fuse, or by the inherent capacity of the secondary transformer or power supply, or a combination of a secondary winding and an impedance. A circuit derived from a line-voltage circuit by connecting a resistance in series with the supply circuit to limit the voltage and current is not identified as a low-voltage limited energy circuit. or has been tested and found suitable for a specified purpose.

The means for identifying listed equipment might vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

NA

North American

OA

outside air

PDU

power distribution unit

PLC

programmable logic controller

POD

Performance-Optimized Datacenter

PPE

personal protective equipment

PSI

pounds per square inch

PUE

power usage efficiency

RH

relative humidity

structure

Enclosure of sufficient size to enable entry of personnel.

UPS

uninterruptible power system

VESDA

very early smoke detection apparatus

Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (mailto:docsfeedback@hp.com). Include the document title and part number, version number, or the URL when submitting your feedback.

Index

A

AD detail screen 45
adding a phone 68
Adiabatic components 61
Adiabatic media 62
Adiabatic unit blowdown 77
Adiabatic unit detail 60
AHU overview 61
AHU system 61
AHU theory of operation 62
air filter sensor 70
alarms chart 49
alarms, ECS 49, 51
alarms, forcing 57
alarms, setting 56, 57

B

battery backup during EPO event 21
before you begin 6
before you contact HP 84
bonding 25
BSMI notice 86
buttons 6, 8

C

capacities 26
charts screen 47
cold weather operation 82
cold weather startup 79, 80, 81
communication 66
component health 6
components 8
components, Adiabatic 61
components, ECS 35
components, electrical 13
components, identification 8
components, life safety 10
components, security 17
components, standard 70
components, structural 8
connection portals 36, 66
connectors 8
considerations, environmental 7
contact information 84
control cabinet identification 16
control settings 54
controlling the fan speed 60
controls 25
controls network screen 50

D

demarcation box 36, 67
dimensions and weight 72
drop boxes 32

E

ECS components 35
ECS indicators 20
ECS menu, configure 54
ECS menu, view 43
ECS parameters, maintaining 58
ECS screen, AD detail 45
ECS screen, alarms 51
ECS screen, charts 47, 48, 49
ECS screen, controls network 50
ECS screen, electrial cabinets 49
ECS screen, stats 52
ECS screen, top 43
ECS touchscreen 20
ECS, configuring 38
ECS, connecting to 36
ECS, facility connections 35
ECS, logging in to 40, 43
ECS, managing settings 37, 56
ECS, navigating 42
ECS, using 34
egress 24
electrical 25
electrical cabinets screen 49
electrical panels 27
electrical power component identification 13
electrical system 25
emergency egress 24
environmental considerations 7
environmental control system (ECS) 34

environmental specifications 73
EPO accidental activation 21
EPO modes 21
EPO system 19

F

facility connections 35
fan speed 60
features 8
Federal Communications Commission (FCC) notice 86
fire alarm indicators 23
fire alarm panel 23
fire alarm sequence of operations 23
fire detection 7, 22, 23
fire pulls 6, 22

G

grounding 25

H

HMI settings 55

I

identifying components 8
IP address 57

J

Japanese notice 86

L

life safety components 10
life safety overview 19
life safety systems 19
lighting 33
lightning protection 26
locating the ECS IP address 41
logging in to ECS 40, 43

M

maintenance 74
maintenance, preventative 7
managing ECS settings 37
modifications, FCC notice 86

N

navigating the ECS interface 42
networking 66

O

operation, cold weather 82
operator safety 6
optional components 71
overview 6
overview, environmental control system 34

P

panel schedule 29
panels 29
part number identification 9
parts identification 9
password protected 42
periodic maintenance 74
power 25
power distribution kit 28
power distribution, AHU system 28
power distribution, Starline 28
power down procedure 83
power feeders 27
power safety 25
power up checklist 79, 81
power up procedure 79
power up, cold operation 80
power up, ECS 80, 82
power up, electrical 80
power up, standard operation 80
pressure sensors 58
preventative maintenance 7
product overview 6
psychrometric chart 48

R

rack power 32
racks 18
readings chart 48
regulatory compliance identification numbers 86
regulatory compliance notices 85, 86
regulatory compliance, HP POD 240e NA 85

S

safety and NEC compliance 85
safety considerations 86
safety information 86

safety, component 6
safety, power connections 25
satellite boxes 35
security 17
security component identification 17
sequence of operations, fire alarm 23
server blade components 8
setting the IP address for each power meter 57
setting the relative humidity 56
setting the temperature 56
site electrical system 25
specifications 72
specifications, environmental 72, 73
specifications, general 72
specifications, rack 72
standard power up 79
Starline 30
static pressure control 65
status screen 52
structural components 8
supply header blowdown 78
supply header gravity drain 76
system components 8

T

temperature sensor 58
theory of operation 62
top screen 43
Turkey RoHS material content declaration 86

U

Ukraine RoHS material content declaration 86

V

VESDA 22

W

warranty 86
winterize, HVAC units 74
wire color code 29